THE MODEL ENGINEER

Vol. 95 No. 2378 THURSDAY DECEMBER 5 1946 6d

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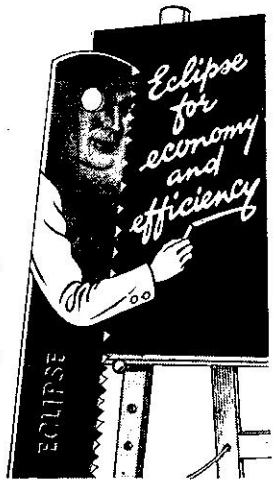

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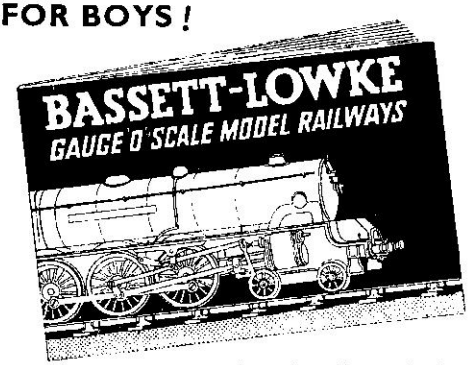

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THE
MODEL ENGINEER

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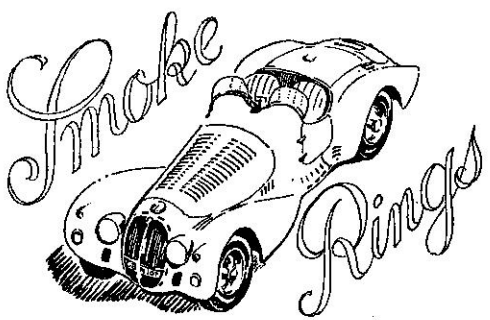
VOL. 95. No. 2378 DECEMBER 5th, 1946

Smoke Rings



The Valve

ONE of the latest of the club organs to find its way to my desk is *The Valve*, the news sheet of the Bolton Society. Brightly produced and full of the true club spirit, this little monthly magazine will, I am sure, become a very welcome feature in Bolton club circles. In the November issue there is an eloquent appeal on behalf of the younger generation, from which I quote this:—"The beginner must be encouraged to carry on with his craft, even though his workshop is not fully equipped, and even if he has no workshop at all. The advantage of our hobby is the pleasure we derive from dreaming, planning, designing, and then, if possible, making our ideas take shape. What about the overcoming of our difficulties? Isn't that the greatest fun of all? So the beginner must be encouraged and helped all the time." I think we shall all echo those sentiments, which I am sure apply equally to the adult beginner as to the junior. Many model engineers take up the hobby in their later years and they, too, would appreciate a helping hand when they are making their initial efforts. *The Valve* is available to non-members at the modest cost of 3s. per annum from the Editor, Mr. C. E. Picken, 139, Smithills Dean Road, Bolton.

Models at the Bradford Museum

THE Bradford Society has been accorded the honour of a display of members' work in the Cartwright Memorial Hall Museum, where the models will be on view until the end of February next. The exhibit, which consists of locomotives and photographs, includes: Mr. Thos. Kendall's model of a Stanier 0-6-0 tank locomotive, built in 3½-in. gauge, from details published in THE MODEL ENGINEER. Mr. Amos Barber contributes a gauge "O" model of a L.M.S. 4-6-0 passenger express locomotive, the prototype of which was originally built for the old Lancashire and Yorkshire Railway. The two other locomotives in the exhibit were used for hauling passengers in Lister Park, Bradford, during the "Holidays-at-Home" period in August, 1946. One was built by Mr. Gilbert Bower, a 2½-in. gauge model of a L.M.S. Pacific "Princess Royal" class 4-6-2, while the other, a free-lance design by Mr. Duncan Graham, in 3½-in. gauge, is a 4-6-2 passenger locomotive. The exhibit is completed by a series of photographs showing the actual tracks in the Park, with the locomotives hauling loads of young passengers.

Malden Calling All Societies

THE Malden and District Society of Model Engineers is endeavouring to compile a register of all other similar societies and model railway clubs in the British Isles. Every secretary concerned, therefore, is cordially requested to send his name and full postal address to Mr. H. A. Hammett, Mount Tavy, Cranes Park Avenue, Surbiton, who will duly add it to the proposed register.

Hobbies at Lewes

I AM pleased to hear that the Lewes Borough Council have under consideration the formation of a Civic Society to consist of a number of groups for the development of various hobbies and cultural interests in the district. In particular, a group for model engineering and model railways is contemplated and readers in this part of Sussex are cordially invited to rally round Mr. Hereward E. Parrish, who has an extensive "O"-gauge layout in his house, will be pleased to arrange a meeting if both "live steamers" and other railway enthusiasts and model engineers will respond. His address is Fosdyke, Houndean Rise, Lewes.

Calling Aberdeen

MR. ALASTAIR A. IMLAY, Westhill House, Skene, Aberdeenshire, would like to get into touch with any model engineers in Aberdeen or the surrounding district. He is a regular reader of THE MODEL ENGINEER, and is interested in locomotives, particularly the electric locomotives described by "Milli-Amp." Interested readers are invited to make contact with Mr. Imlay at the address given.

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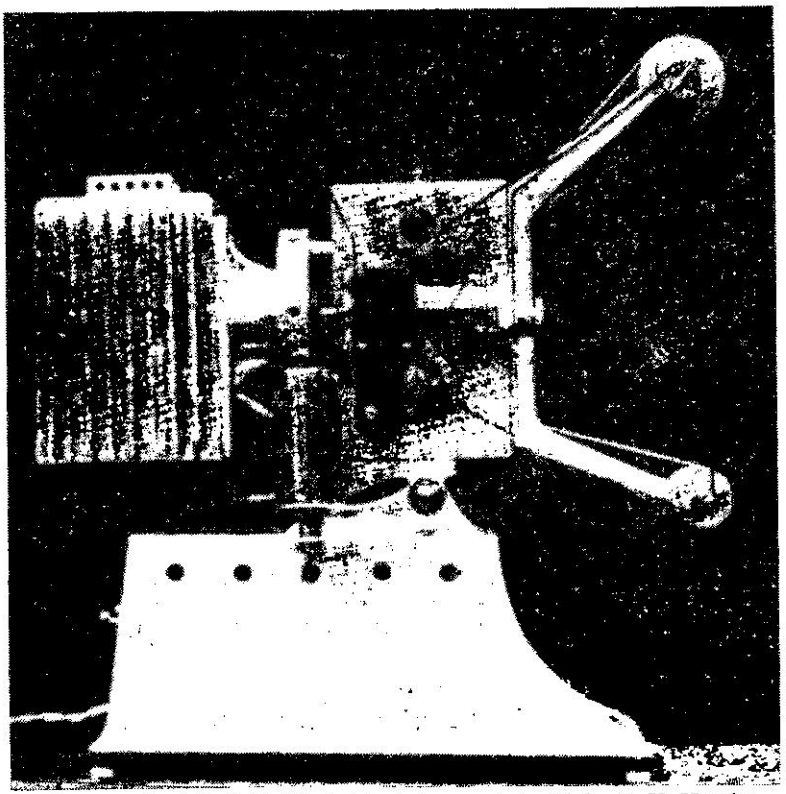
MODEL ENGINEERING IN IRELAND

By E. T. Westbury



An example of the "M.E." ciné-projector, made by Major D. H. Hayden

OF the many delights of model engineering, not the least is that obtained from social intercourse between its devotees, and the doorways which it opens to new and lasting friendships, based on common interest. I count myself singularly fortunate in this respect, for I have made many acquaintances, often initiated through a letter querying or commenting upon some current topic in THE MODEL ENGINEER, which has led to correspondence, and eventually a meeting at some mutually convenient time and place. Most of my visits to model engineering societies have been the culmination of contacts made in this way; and this applies to my visit to Ireland, on the invitation of the Dublin Society of Model and Experimental Engineers. At least two of the members of this society were old acquaintances, with whom I have been in correspondence for some years, and have met in England on one or two occasions; but apart from what I knew of their activities, I had little knowledge of what Ireland had to offer in model engineering interest, and my visit was therefore a "voyage of discovery."

Many abler pens than mine have recorded the charms and romance of the Emerald Isle, a gem of so many facets that only a few of them can be described by a single writer. The many explorers, ancient and modern, who have "discovered" Ireland have recorded various aspects; they have seen it as a land of bogs and banshees, bulls and blarney, of shamrock and shillelaghs, of legends and leprechauns—but few of them have said much about the native craftsmanship of the Irish, the early signs of which are to be seen in the ancient relics of Celtic industry preserved in their national museums, and the modern developments, in thriving industries which keep this little island well and truly "on the map," in a world becoming ever more and more difficult to live in.

Model engineering interest has always been strong in the industrial parts of Ireland, and it is worthy of note that the Dublin S.M.E.E. is second only to the London S.M.E.E. in seniority, having been founded in 1900, and having survived many changes of fortune in the intervening years. Many of the members of this society have won awards at various times in THE MODEL ENGINEER Exhibitions. On the occasion of the meeting which I attended, a large and varied collection of models had been mustered, among which I

was very gratified to recognise several which had been made to my own designs, and others well known to THE MODEL ENGINEER readers. These included an "Atom V" engine, by Mr. E. A. Tramp, a keen model power boat enthusiast whom I have known for many years, and another of the same type in course of construction by Mr. J. Willis, equally keen on boats, but hitherto known as an exponent of flash steam; I described his ingenious and highly successful "flat quad" engine several years ago. Mr. Willis is producing his own die castings for the "Atom V" engine, and his dies for the crankcase and carburettor, produced with very modest workshop equipment, are a real masterpiece of craftsmanship and ingenuity, having gained the Warren Trophy at the Dublin S.M.E. Exhibition, and also a bronze medal at THE MODEL ENGINEER Exhibition. An example of THE MODEL ENGINEER Road Roller engine, and a partially-built "1831" engine, was exhibited by Father Stritch, of Cork, who made his own patterns for these engines. Major D. H. Hayden showed an example of THE MODEL ENGINEER ciné-projector, most of the working parts for which, apart from main castings, were made in stainless steel. Interesting items of workshop equipment, including some which have recently been described in THE MODEL ENGINEER, were shown by Col. Niall McNeill. Among steam engine exhibits, Mr. L. McGill's compound engine, direct-coupled to an electric generator, was of special interest, and the ¾-in. scale "Princess Royal" locomotive chassis, by Mr. D. Campbell, showed promise of being a first-class model when finished. Mr. R. McC. Blakeney's ¾-in. scale "Gwen Elms" locomotive presented some unusual features and ingenious methods of construction, and another outstanding locomotive was Mr. J. D. Stone's steam-driven gauge "O" 4-4-2 tank locomotive, a faithful scale replica of a well-known prototype on the Irish Railways. It may be mentioned that the latter exhibitor, after having been very seriously injured and permanently disabled in a road accident, found in model engineering a solace for his afflictions, and an interest in life which has definitely helped him in the uphill struggle to recovery.

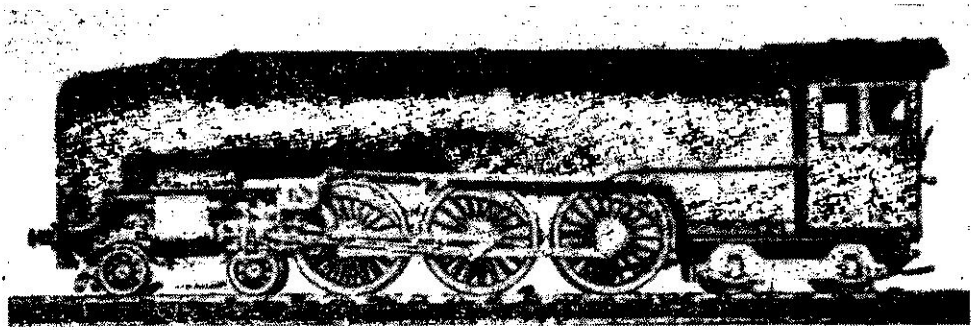
My short sojourn in Ireland was as crammed with action as a Cook's tour of Europe, as I was naturally keen to see all I could of engineering interest, and many members of the Dublin Society were able to help me in this quest. Among the centres of industry which I visited, none was more interesting than the general engineering shop of Mr. E. Chew, a member of the society, whose versatility, and capacity for prodigous feats of engineering seem to be unlimited. He can design, build, repair or reconstruct any machine—from a cinematograph to a concrete mixer—and still retain a keen interest in model engineering! At a time when supplies of tools and materials were particularly difficult, his help to the society in this respect has been invaluable.

No tour of Dublin would be complete without a visit to the famous brewery whose products, they say, are "Good for You", and seem to be appreciated even by ostriches, sea lions and toucans, to judge by the posters. (I wouldn't know!) To the militant temperance reformer, a brewery may appear to be the fount and origin of all evil, but to the engineer, it presents a world of interest. The vast copper boilers, the maze of pipework, conveying machinery, control gear and so on, represent not only a noreworthy feat of engineering organisation and development, but also a few million man-hours of skilled craftsmanship.

Dies and die castings for the "Atom V" crankcase, by Mr. J. Willis

I was very interested in the little narrow-gauge locomotives which are to be seen hauling endless strings of cask-laden wagons in the Guinness brewery yards. These are very unusual in design, having the cylinders and cranks mounted on top of the boiler, and coupled to the driving wheels by rods on either side. There appears to be no doubt about their efficiency, to judge by the way they handle heavy loads. A particularly ingenious device is employed to adapt these locomotives to work on tracks of normal gauge—which, by the way, is wider in Ireland than it is in this country. Special bogies are provided for the locomotives, which are lifted bodily by means of a crane and lowered into them, the locomotive wheels resting in contact with drums on the axles of the bogie wheels and driving them by friction.

Through the courtesy of Col. McNeill, I was invited to visit the Ordnance Survey offices and printing works, situated amid sylvan and unspoilt surroundings in Phoenix Park, Dublin. Here I was initiated into the mysteries of map-making, including photo-lithography and intaglio



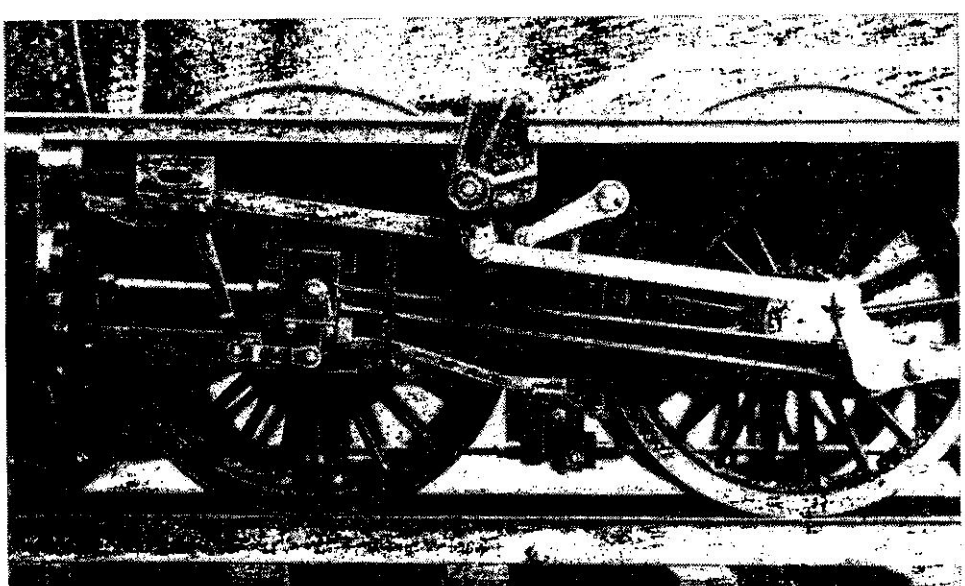
Mr. R. McC. Blakeney's 3½-in. gauge "Gwen Elms"

printing from hand-engraved metal plates, also the copying of documents and ancient manuscripts by the collotype process; all of which I found extremely interesting and instructive.

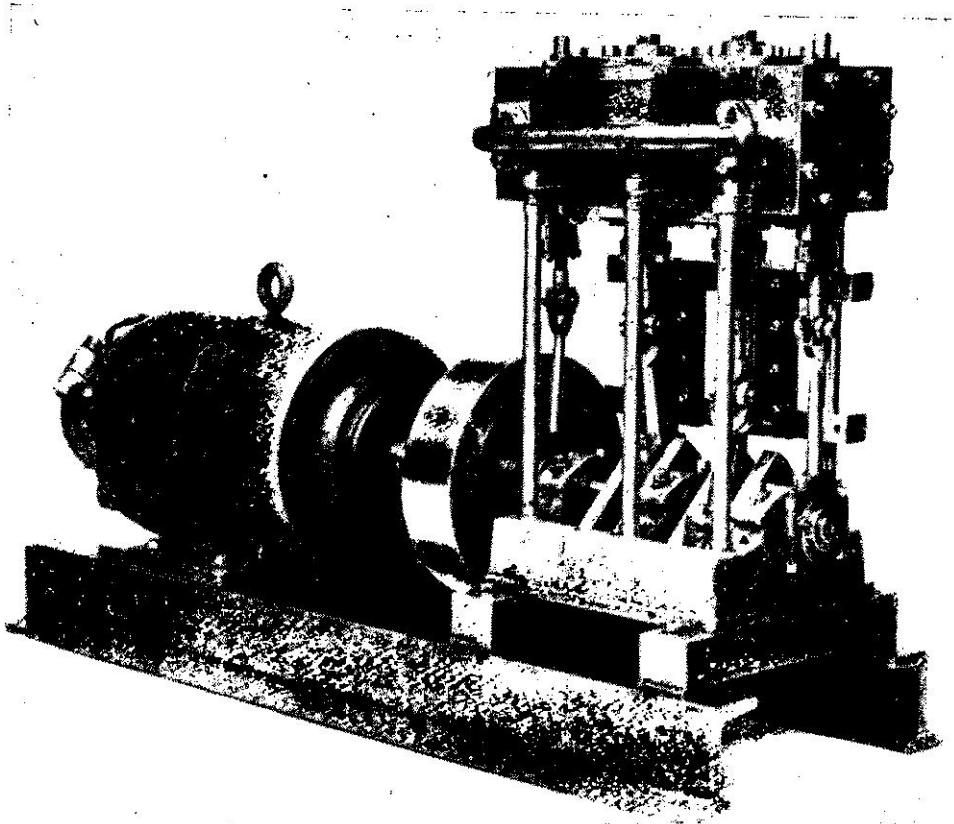
Incidentally, I noticed that an unending procession of vehicles, mostly horse-drawn, was engaged in conveying fuel from the huge dumps in Phoenix Park; shortage of coal has made it necessary to revert to the traditional native fuel, peat—though I found that it was very rarely called by that name, being universally known as "turf" by the people handling it.

I also visited Mr. Fry, of Dundrum, and saw what must be one of the most remarkable model "O"-gauge indoor railways in the world. Occupying the entire top floor of the house, it embodies a complicated scenic layout, with buildings grouped in both urban and rural settings, and railways at various levels, including an authentic underground "tube" railway, and street tracks for tramcars. All vehicles and rolling stock are true scale representations of definite prototypes, and run in settings appropriate to their natural habitat. The entire railway and tramway system works automatically, including signals and traffic control, with level crossing gates which hold up either trains or road vehicles as occasion requires, and never cause crashes through "errors of judgment." All is complete, down to train whistles and sirens of appropriate tone to the type of locomotive, and the exhaust beat of the engines as they pull out of the station, "link up" at full speed, or labour up a gradient with a heavy load.

My itinerary in Ireland included a visit to the Ulster Society of Model Engineers, at Belfast; this society is a much younger one than that at Dublin, but extremely virile and progressive, as befits a locality which is world renowned for its skilled industries. Here I was the guest of Mr. E. C. Munday, the secretary of the society, and I was also taken to see other



A close-up of the motion work on the chassis of Mr. D. Campbell's 3½-in. gauge "Princess Royal"



Mr. L. McGill's compound engine and dynamo

members, including the Rev. Henry T. Brown, who is well known to readers of THE MODEL ENGINEER as a very active locomotive builder. His workshop, and the products produced in it, would be an object lesson to those who believe that elaborate and extensive equipment is a necessity to good model engineering.

At the meeting of the Ulster S.M.E., several very interesting exhibits were produced by members, including a very fine example of THE MODEL ENGINEER Road Roller and a model racing car, by Mr. Coulter. Sections of the society's all-metal portable multi-gauge track, which appeared to me to be very ingenious and effective, and about which I trust readers will hear more in due course, were also shown.

The purely social side of my visit, about which a great deal might be written, will perhaps be of little general interest to readers, but I trust it will be permissible to refer to the happy little family parties to which I was invited, and the large, but none the less, intimate gathering at the Dublin S.M.E. dinner; also the pleasant motor drive along the Ulster coast road, and the equally interesting visit to Glendalough, in Co. Wicklow. The efforts to make my trip an interesting and enjoyable one were something to remember, and the characteristic courtesy and good nature for which the Irish are noted was turned on at full pressure. Without making any distinctions, I would like to record my sincere appreciation of the hospitality of Mr. and Mrs. Tramp, Mr. and Mrs. Fletcher, Mr. Blakeney, and my host and hostess, Mr. and Mrs. Willis, all of whom contributed to one of the most enjoyable "busman's holidays" I have ever spent.

Electron Jubilee Celebrations

The fiftieth anniversary of the discovery of the electron, by the British physicist, Sir Joseph Thomson, O.M., will occur next year. To mark this jubilee and to demonstrate the tremendous influence such an advance in pure physics may have on the life of the community, the Institute of Physics and the Physical Society are jointly arranging a series of meetings and other functions to take place on September 25th and 26th, 1947, in London. A special exhibition which will remain open to the public for several weeks, will be held at the Science Museum, South Kensington, and will show the development of the vast range of modern industrial equipment from its earliest experimental origins.

Further details will be announced in due course.

The "M.E." Exhibition

One of the Judges looks at it from his point of view!

OF all the jobs which go to make an exhibition possible, one of the most onerous and least enviable is that of the judges.

Human nature being what it is, the decisions of the judges are almost bound to cause dissatisfaction to some, and to be questioned by many.

Now, in the nature of things, the judges have access to information which is not available to the competitors, or to the public at large.

The judges are not paid for their work, they have no sort of an axe to grind; their job is a difficult one and calls for much patience, concentration and hard work.

It is, therefore, surely not asking very much if it is suggested that their decisions should be accepted without grumbling or hard feeling. Nobody, least of all the judges themselves, would claim that they are infallible; but they are all people of sound engineering training and wide experience and they conscientiously do their utmost to arrive at just and fair decisions; more they cannot do. When one plays cricket one does not argue with the umpire, nor does one query his decisions.

Let us now consider some of the points which influence the judges' assessment of the merits of competition work.

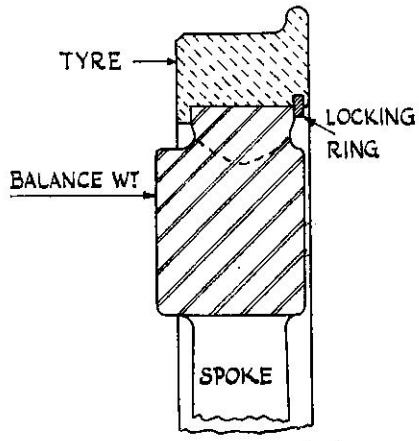
What follows applies principally to model locomotives, but, to some extent parts of it apply to the models in other purely engineering sections too.

First, it must be appreciated in considering the points to be enumerated, that when a model locomotive is entered for competition at an exhibition such as THE MODEL ENGINEER show, it is judged and assessed on its workmanship, finish, realism, and correctness of proportion and detail, and not on its working potentialities.

Wheels. A fault to be found on a large proportion of model locomotives is the failure to simulate by suitable machining the tyres on wheels; there is no excuse whatever for this as it only involves a simple additional operation when the turning is being done.

Probably not one model in five in the competition section was correct in this respect as regards the front of the wheel, and certainly not one model in ten indicated the tyre at the back of the wheel.

Balance weights do *not* merge solidly with the tyre, yet several generally excellent jobs so showed them.



Section of locomotive wheel

Another common fault is the high polishing of wheel rims, and not infrequently, treads as well. That is contrary to full-size practice and serves no purpose whatever (other than to lose marks for the offending model).

Yet a further fault is the common failure to bevel the outer edge of the tread, again there is no excuse, as to machine this correctly does not add two minutes a wheel to machining time. The drawing shown is a large-scale section of a full-size wheel rim and tyre and indicates quite clearly the foregoing points.

Boiler Mountings. Probably more otherwise excellent models are kept out of the top class by faults in boiler mountings than almost any other single fault.

Again, there is little or no excuse. The man who is capable of making an otherwise correct model can most emphatically make correct boiler mountings for it if he will take a little trouble.

Drawings are easily available these days, and it is not difficult to make accurate scale templates for the contours of chimneys, domes and safety-valve casings, etc. One of the commonest faults is the making of the flanged portions which sit on the boiler barrel or smokebox far too thick, chimney caps too are frequently coarse, clumsy, and badly contoured; result, lost marks.

Dome covers in the real thing are almost universally made from comparatively thin sheet metal; some of the models in the Exhibition would indicate that this was usually about an inch thick!

Materials. Another prevalent fault is the use of unsuitable materials for specific jobs.

Gunmetal cylinders and cylinder covers on a working model, particularly in the smaller sizes, would lose few, if any, marks under the heading "suitability of material."

On the other hand gunmetal buffer stocks (and sometimes even heads) are not to be excused, numerous examples were to be seen German silver is *not* the right material from which to make hand-rails and hand-rail knobs, and in these days of stainless-steel, there remains no excuse for using it; again there were far too many cases where it *was* used.

Buffer stocks and heads are almost as great sinners against correctitude as are boiler mountings. There were quite a few cases of heads being too small in diameter (or in width in the

case of oval buffers) but even more of their being far too thick, a fault which springs immediately to the experienced eye and detracts seriously from realistic appearance.

In only very few cases were buffer beams fitted with accurate angle-brackets to transmit the buffing strains to the main frames.

Slot-headed Screws. Once again it is sad to have to record that these unrealistic abominations reared their hideous heads in all sorts of prominent and inexcusable places.

They are completely out of place in motion-work, where they were freely used, and in fact there are very few places indeed where they have any right to be visible in a model locomotive making serious claims to realism.

Proportions. Quite a lot of models embodying much excellent workmanship fell down because of bad proportions in their smaller details. One quite well-made engine had a screw-coupling, the links of which were of a diameter equal to about $\frac{1}{2}$ in. in the real thing, whilst the screw was a bare scale $\frac{3}{4}$-in. diameter, both these dimensions, of course, being far below standard. Lamp brackets and steps were frequently coarse and clumsy, so were hand rails; if such details cannot be kept true to scale (and there is usually no reason at all *why* they cannot) they are best omitted. A careful study of the proportions of the details of a full-sized locomotive will be amply repaid in improved appearance in the model.

Paintwork and Finish. Like slot-headed screws, this is a perennial source of trouble and very few models indeed were above criticism here.

Faults

Usually the faults fall under two heads, (a) poor surface finish, brushmarks, wrinkles, tears, "lace curtains," dust and grit embedded in the paint, and on one model even the remains of a dead fly; (b) incorrect colour.

For faults under (a) there is little excuse. With patience and forethought, and by the use of a multiplicity of very thin coats, each being allowed thoroughly to harden and afterwards rubbed down with pumice powder, and by taking every possible care to exclude dust during drying, it can be almost entirely overcome.

Admittedly, it is a tedious job, and there probably lies the answer to the poor standard this part of the work usually attains, by the time the painting job is reached the builder is most anxious to get his engine on the track, and in consequence rushes the job, and it is a job which just can't be rushed if good results are to be attained.

Fault (b) is rather more difficult, and there is more excuse for it; it is not everyone who is blessed with an accurate and acute colour sense to begin with; secondly, paint does not always dry out the same colour as it is when wet, and again, the effect of heat too may be most upsetting.

There are remedies; if you have not got a good colour-sense, enlist the help of someone who has.

Before painting your model, paint a piece of metal and check the colour when dried out, adjust your mixing or blending accordingly until you get the desired result.

For boiler and firebox covering, do the same thing, but heat the metal up to say, 150 deg. F. to 170 deg. F., and maintain it steadily at this temperature for two or three hours, and note the effect, the result is usually a considerable darkening; again adjust your blending until you get the desired result.

Time and trouble spent on this part of the work are always well spent and will be amply repaid.

Plating

Apart from paint, the most noticeable faults are a tendency to resort to highly polished nickel or chromium plating, and to put too much polish in the wrong places, accompanied all too often by a rubbing away of corners and a slight rounding of what *should* be dead flat surfaces.

Finish should be strictly comparable with that of the original, one does not see mirror-like connecting rods and coupling rods on full-sized locomotives, they would be quite out of place, as they are also on the model.

From the foregoing it might easily be deduced that the competition models were a poor lot. That would be utterly erroneous. The general standard was good, though frankly in the writer's opinion, 1946 will not go down as a vintage year in model locomotive annals. Nevertheless, there were some most excellent jobs in all the locomotive sections. The winners of the principal awards were in every way well up to standard and thoroughly worthy of their prizes, and in passing their final placing in order of merit, caused the judges a lot of hard thinking.

There was, too, a complete absence of the sub-standard type of job which on occasions has been fairly prominent at past exhibitions, and it was a welcome absence too.

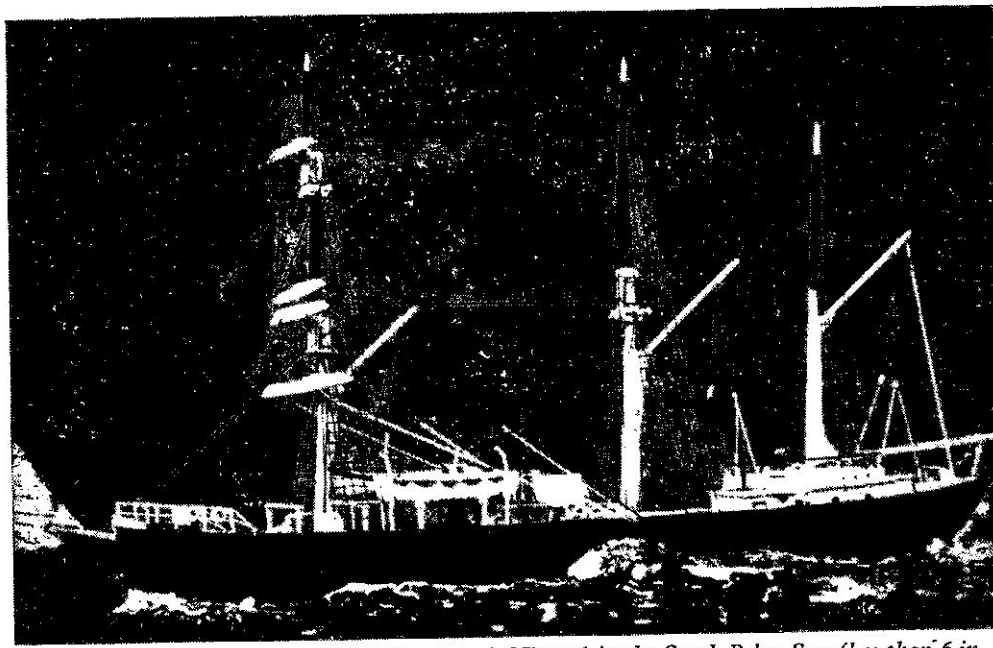
Pitfalls to Avoid

These criticisms are written in no carping spirit, but in the earnest hope that they will indicate to future competitors pitfalls which they should, and quite easily can, avoid, and so help still further to improve the high standards of craftsmanship and realism already attained.

The writer has purposely refrained from referring to specific models, either in praise or blame; some people just can't take criticism in good part, and it is no part of a judge's job to distribute praise without blame where it is due.

It is suggested, however, that if competitors, both successful and otherwise, will objectively weight up their own work in the light of the foregoing and see how many of these criticisms apply to *their* particular handiwork, by so doing they will learn quite a lot which will help them on the road to still further improving the standard of their productions, a thing all of us should strive continually to do.

Finally, "Don't shoot the judge, he is doing his best!"



Model to scale of 1*-mm. to* 1 *ft. of Shackleton's* Nimrod *in the South Polar Seas (less than* 6 *in. long). Note the realistic sea and part of iceberg in background. By M. E. Moon (London, N.7)*

*SHIP MODELS
at the "M.E." Exhibition
by "Jason"

THE cup winners have been discussed in some detail in my previous notes and notice has already been taken of the winner of the Hampshire Prize. In dealing with some of the medallists I drew attention to the contest between Mr. Bell with his Championship Cup winner, the *Kobenhavn*, and Mr. Hume, who exhibited a French 42-gun frigate, *L'Aigle*. Mr. Hume, a worthy runner-up, was awarded the Silver Medal in the Class 10. This class, by the way, was full of models of a surprisingly high standard, and Messrs. Bell and Hume are to be congratulated on being leaders in a hard-fought contest.

In my previous notes I only dealt with one of the bronze medallists, Mr. Miller's miniature, the corvette *Morpeth Castle*. I have predicted great things for Mr. Miller after some wider experience in his present high standard of craftsmanship.

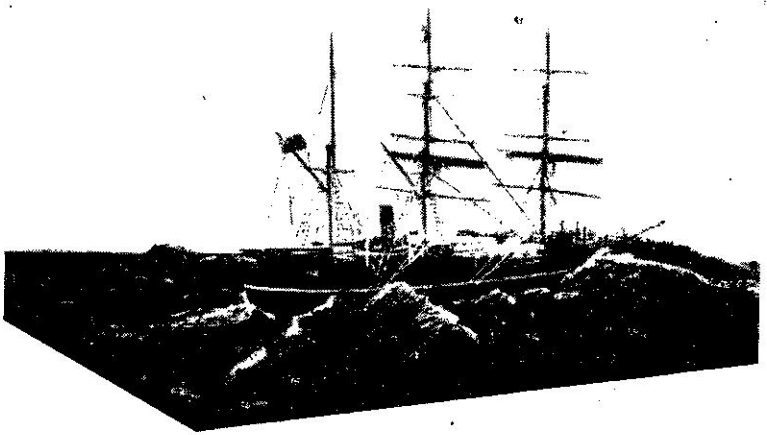
Now to continue. Mr. Moon (London, N.7) scored a hit with the judges and the public in exhibiting his 1-ft. scenic *Nimrod*, Shackleton's famous South Polar ship. He gained a bronze medal. His chosen scale of 1 mm. to 1 ft. is gaining in popularity. He pleased me with his well-scaled rigging, very effective "sea" and clean workmanship. No doubt Mr. Moon has now found out that floe-ice does not reach 50 or 60 ft. in height, i.e. a beautifully flat and horizontal top. As there is definite indication of "wind and weather," a "smooth lee" to the iceberg would have been more effective.

The famous *Thermopylae* was a model well in the front rank of Class 10. Mr. F. W. Shipsides (Portishead) is to be congratulated on a very fine action-scenic (one-footer) model displaying a faithful scale in rigging. He showed her under nearly full sail in the scale $\frac{1}{16}$ in. to 1 ft. I can imagine other materials for his sails, but Mr. Shipsides played for safety in an otherwise bold and artistic effort. The 10 degree list in comparatively smooth water deserved a whiter wake and a more pronounced bone-in-her-teeth, especially as she had shortened sail somewhat. A well-deserved bronze medal, Mr. Shipsides, but in a nice fresh breeze let the reef-points be blown well to leeward. At this scale the *Thermopylae* was a very creditable piece of work.

Power Boats

We'll leave Class 10 and go over to the power boats. As a class the working models were generally medium, with a number of outstanding efforts. I have already noticed Mr. Tilley's *Yarmouth Steam Drifter*, winner of the Championship Cup for the best steamer model and the

*Continued from page 522, "M.E.," November 28, 1946.



Captain Robert Falcon Scott's Discovery *under storm sail and "running before it." Shows particularly the use of sea "effect" in a "scenic one-foot" model*

Torpedo patrol boat in the Hydroplane Class ; working model— awarded bronze medal. A very effective looking power boat by A. M. Welter (Northampton)

Spectator Cup winner, the free-lance *B Type Motor Launch* by Mr. Squire.

A silver medal was won by Mr. W. T. Dorrington with his *Queen Mary* (Cunard White Star liner), to a scale of $\frac{1}{16}$ in. to 1 ft. I have seen many *Queen Marys* and other popular large liners. I can say that few of them surpassed Mr. Dorrington's model for detail finish and lines. Yet Mr. Dorrington built his *Queen Mary* as a *working* model and had to make his own "water" in his garden. Tough luck, Mr. Dorrington, that Bristol, the very cradle of the Western Ocean Trade, cannot manage a pond or two for model boat work.

Colonel L. C. C. Harrison gained a bronze medal for his destroyer *Javelin*. This was a clean-looking job with "live" lines and the maker showed a very nice judgment in what to show and what to omit in his deck details.

In Class 7, among the hydroplanes and speed boats, there was variety with a high general level, but the two leaders had a tussle, one for "insides" and one for "outsides." This class is for working power boats, and Mr. A. L. Headech (Carshalton, Surrey) won the silver medal with his *24-in. Streamlined Hydroplane*, not a great deal to look at, being the more or less conventional design for a hull, but with a very efficient engine, notable alike for layout, accessibility and clean workmanship. Bronze medallist A. M. Welter (Northampton), on the other hand, showed a really effective-looking *Diesel Engine-driven U.S.A. Torpedo Patrol Boat*. Probably Mr. Welter's T.P.B. was the nicest and most natural-looking model in the Exhibition. It caught the eye, yet Mr. Welter would, I think, be the first to acknowledge Mr. Headech's superior engine work. Both these models gave much pleasure to thousands of visitors.

Class 8 devoted to marine machinery has, I think, been reviewed elsewhere, so I will pass to Class 9, *Sailing Vessels capable of being sailed.* There were a small number of entries, but here again the standard was high. The silver medallist here was Mr. H. A. Cox (Fawley, Southampton) with his model of a *Ship-rigged Yacht.* A yard and a half long and fully rigged on three masts she, of course, broke away from orthodox wind-

jammer rig. She was intelligently rigged for her purpose, a working model. Her finish was superb. Underwater lines were efficient for pond work, leaving at the same time a pleasing waterline appearance. Mr. W. H. L. Wake (Addlestone), the bronze medallist, on the other hand, presented an orthodox 36-*in. Restricted Class Racing Yacht.* Here, too, there was excellent craftsmanship, and I particularly admired his sails in material and workmanship.

A junior prizewinner was Mr. J. Weatherall (Denham, Bucks) with his sailing model of the Thames sailing barge, *Lady Daphne.* I overheard some minor criticisms of the deck arrangements, but that did not detract from the craftsmanship standard but rather shows the undesirability of "naming" a model if not working to accurately detailed plans.

Criticism and Praise

This concludes the list of prizewinners, so I will now select here and there a model for helpful criticism or praise, especially among the diploma winners. The first I select is Mr. D. McNarry's *Archibald Russell* (V.H.C.). Here was an excellently scaled (1/32-in.) model, especially in standing and running gear. Choice of cordage colour excellent, yet I noticed the prominent ridge between the two colours of paint.

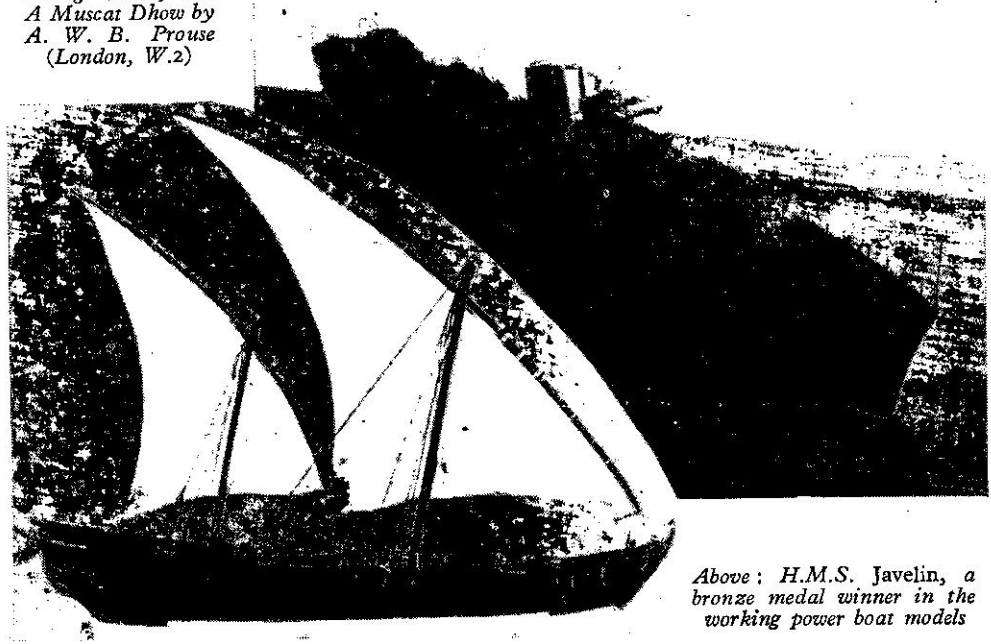
A damp chamois leather and dentist's powdered pumice stone would have worked wonders. If the powdered pumice stone is fine enough for your teeth it is fine enough for your model. Another point: where sails are shown in the furled position on the yards, make sure that the royals are considerably thinner than the courses. Another matter is that of clewing up the courses. On the *Archibald Russell* type of windjammer the courses clewed up to the yard-arm because the size of the sail would make an enormous bunt (bundle in the middle) otherwise. In any case, the leech of the sail was scarcely more than half the distance from the yard-arm to the mast, and to show the clew-irons peeping out amidships is a "pretty" touch which must be avoided by serious modellers. Mr. McNarry has the makings of a cup winner.

A Working Model

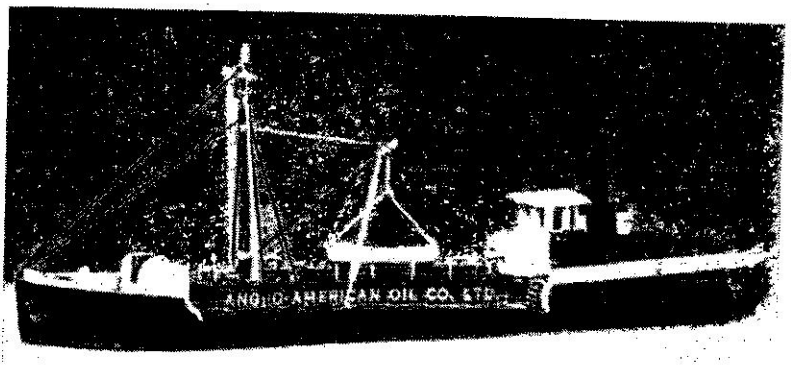
Mr. Shields (of Chelsea) submitted a picturesque model of a *Breton Tunney-fishing Boat.* I was enjoying myself in criticising this model when I suddenly realised it was a *working* model, and in its proper class, too. I feel that Mr. Shields could turn out a fine exhibition model of this boat he so obviously admires. Possibly he might profit by some tips on roping a sail, the use of coffee or tea as a brown stain, and a pint of beer to a coachpainter (there are still some left who scorn the spray and the cellulose) will reveal some hints of "finish." Anyhow, there are several ship model societies within easy reach.

Mr. Sprange (North Harrow) presented a "Draperesque" *Discovery.* Miniaturists in general will find inspiration in Mr. Sprange's work. I admired Mr. Finch's choice of subject in his *Graf Spee* and *Ajax* together and to the same scale. I noted how he made good use of the

Below: An unusual model and a sailing model, too. A Muscat Dhow by A. W. B. Prouse (London, W.2)



Above: H.M.S. Javelin, a bronze medal winner in the working power boat models



This fine miniature is the length of a cigarette. So small, in fact, that not many people noticed what the enlarged photograph shows, i.e. the yard-high letters on the side of the hatch. A model meticulously correct and beautifully finished. By R. L. Butler (Ramsgate)

contrasting "battle-greys" of these River Plate Battle opponents. Good work Mr. Finch.

Mr. Money (of Sheffield) who will be remembered for his little gem of the down-and-out windjammer portrayed as a *Coalhalk* has this year been even more unorthodox. His windjammer model was "flattened," as it were, almost to bas-relief. It was displayed between two glasses, one back and one front. He took no liberties, either with scale (in elevation), rigging or finish A pleasing picture that was much admired by all.

I must conclude with a reference to loan exhibits.

Many people paid tribute to Doctor Longridge's *H.M.S. Victory* as she was at Trafalgar. The Doctor worked in the orthodox "eighteenth-century dockyard model" style, i.e. hull, timbered and planked, carried out in natural-coloured woods, boxwood and pearwood. This was a very fine piece of work by a craftsman already well known for his work on the *Cutty Sark*.

The North London Ship Models Society, one of the few societies to keep the ship model flag aloft during the war, exhibited a case of great interest to many. There were dozens of famous ships of all ages and types to the same scale. The models were clean, accurate, well displayed and chosen with care.

Ship modellers in general may like to know that this year's MODEL ENGINEER Exhibition broke all records in attendance, a good augury for the future of our craft.

Ship Model Societies

THE ship model societies are beginning serious work again. A number of them continued throughout the war years with a skeleton membership and a skeleton syllabus. "Jason" will be glad to hear from secretaries and all old friends, c/o The Editor.

Wembley

The Ship Model Society of North-West London has now got into its stride again and is gathering up the reins. Meets first Tuesday each month, at St. Andrews Hall, Ealing Road, Wembley (3 mins. from Wembley Station, L.M.S.). Visitors heartily welcomed. Hon. Sec.: A. PURVES, 65, Eton Avenue, Wembley. WEM. 3410.

Finsbury and North London

The North London Ship Model Society is another one which has kept going throughout. Write Secretary: M. E. MOON, 53, Freegrove Road, Holloway, N.7.

Streatham and Balham

The Ship Model Society of South-West London, has already had several very successful meetings. Meets third Wednesday in the month, at the United Dairy Offices, 184, Balham High Road, Balham. Everyone welcomed, especially artists. Secretary: A. L. TUCKER, 23, Farnley Road, South Norwood, S.E.25.

Merseyside

Mr. K. P. LEWIS, 20, Morecroft Road, Rock Ferry, would like to hear again from old members and those interested. The Ship Model Society was the senior of the societies and it is quite unthinkable that it should go down.

Bristol

The Bristol Societies have kept going strongly throughout the war, and Mr. Bowness needs no boost from me.

Birmingham.

The Ship Model Society of Birmingham had only just started before the war, but I can assure you that when I saw Mr. Field a few weeks ago he was on his toes for a fresh start. Write Secretary: A. E. FIELD, 57, Hawkhurst Road, King's Heath, Birmingham 14.

More news of the other societies in subsequent issues.

*How to Make
A MINIATURE SMUGGLING LUGGER

By Edgar J. March

THE clench-built hull has a good sheer, with high, powerful bows and an easy entrance compared with the bluff bows of the Revenue cutter; below the water the lines were very fine and the floors had a sharp deadrise.

Set out centre line on a suitable piece of wood, cut out and carve down to deck, leaving usual camber, and bulwarks 2 ft. 6 in. high. Set out sheerline and drill holes for gunports and shape-up with file. As a rule the ports were not fitted with lids, but left open, and in bad weather a shield, with hole through to take gun, was placed in position and caulked round to prevent water coming in. Shot racks were fitted between timbers of either side of ports. Bulwarks were open, following normal merchant ship practice, not ceiled as in cutter. Oar ports 41 were fitted to take sweeps for use in calms. The rail and wale just below channels can be left standing proud if care is taken in filing. Fit eyebolts on deck to take the various purchases. Drill hole through port bulwark just clear of stem to take the bowsprit and through transom to take outrigger, and note that steeve of these spars follows line of sheer. Drill holes for masts, making sure they rake at the correct angles, and fine holes through stem for bobstay 37, through bulwarks for jib sheets 3, outhaul 4a, and inhaul 4b, hawse holes 42, bowsprit shrouds 38, outrigger shrouds 36. Glue channels to sides of hull and make snicks in outer edge with a razor blade to take the runners, etc. Line in deck planks and bulwarks with sharp pencil, leaving natural colour.

Deck Plan. The bowsprit is to port, off-centred so that it can be run in clear of foremast. It passes through a gammon iron on side of stem, rests between bitts and is run in and out with a heel rope. In some luggers the bulwark was cut down to take spar and the timberhead left standing and shaped-up (Fig. 3). Abaft foremast is a grating with galley funnel passing through, and then a boat resting on two chocks over a hatch. Next comes the mainmast and capstan. Some boats had a fiferail abaft mast, others preferred to make the gear up round cleats on masts as shown. A companion with the usual sliding roof gives access to aft cabin, and the tiller is just clear of the transom stern. The mizen is sheeted to an outrigger which passes through transom to starboard of tiller and rests between bitts or on a thwart just in front of mast. All these fittings can be made as described in previous articles and glued in position.

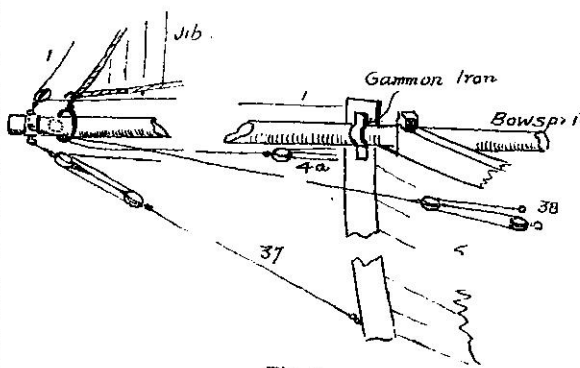


Fig. 3

So far as I can tell from close study of prints and photographs of models, catheads do not appear to have been fitted, but, owing to war conditions, full research into many ambiguous details has been impossible, and I hope that this article will be the means of bringing to light further particulars of an extremely interesting craft, about which little information seems to be available.

Luggers used for smuggling were generally tarred to make them less conspicuous at night, others were varnished with a touch of white or other colour round transom stern. Naval armed luggers had the usual white or yellow strake along gunports and were copper bottomed.

Fit anchor and cable, and a few kegs round bulwarks will add a realistic touch.

Armament. Eight 4-pounders were mounted. Make guns and carriages as described for Revenue cutter. Ringbolts were fitted each side of port for breeching and in deck behind carriages for the gun tackles. Guns were often of brass or painted black.

Spars

Make from boxwood or stripwood to following sizes :—

Bowsprit. 52 ft. long, 12 in. diam. Cranse iron fitted at outer end to take bobstay 37, shrouds 38, and block for topmast stay 1. Drill hole for sheave for outhaul 4a. Fit copper eye in side of stem for gammon iron (Fig. 3).

Foremast. Deck to cap 49 ft., 12 in. diam. Masthead 7 ft.

Topmast, 27 ft. heel to truck, 8 in. diam.

Fore lug yard, 46 ft., 10 in. diam.

Topsail lug yard, 27 ft., 6 in. diam.

Mainmast. Deck to cap, 57 ft., 12 in. diam. Masthead 7ft.

Topmast 31 ft. heel to truck, 8 in. diam.

Lug yard 43 ft., 10 in. diam.

Topsail lug yard, 21 ft., 6 in. diam.

Mizen Mast, 37 ft., 9 in. diam.; masthead 4 ft. 6 in.

Topmast, heel to truck, 21 ft., 6 in. diam.

Lug yard, 30 ft., 8 in. diam.

*Continued from page 533, "M.E.," November 28, 1946.

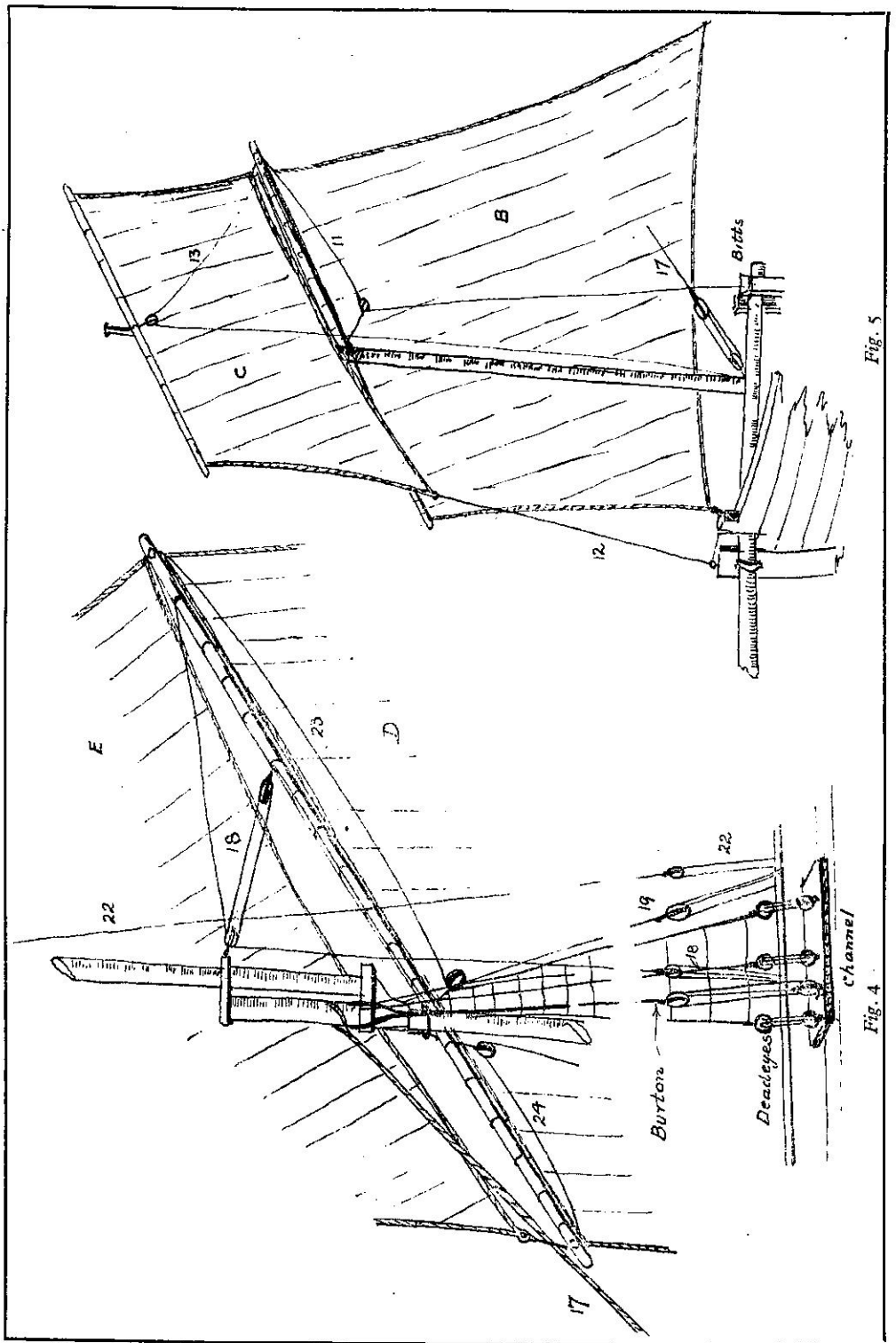

B
C
D
E
11
12
13
17
Bitts
18
22
23
24
17
22
19
18
Deadeyes
Channel
Burton

Fig. 5

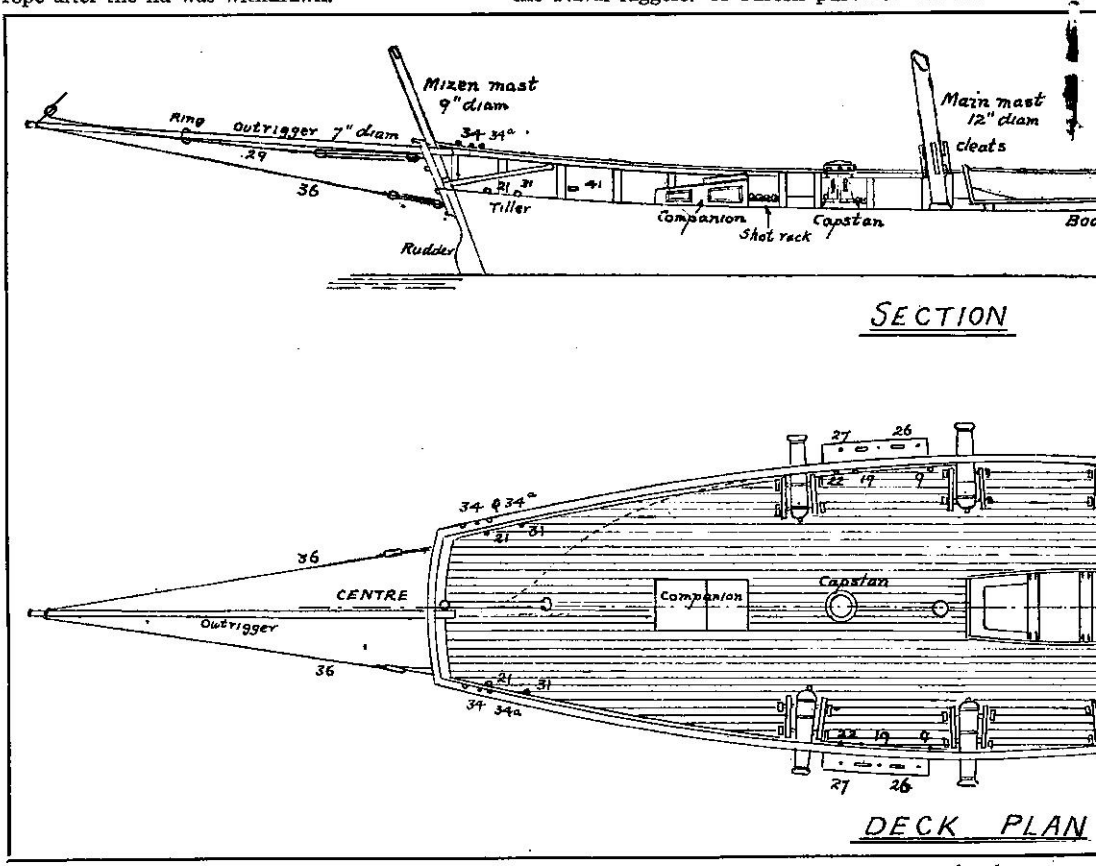
Fig. 4

Topsail lug yard, 20 ft., 6 in. diam.

Drill holes in lower masts just below bottom cap for dumb sheave for halyards. Make shoulders at topmast heads to take rigging and drill sheave holes for halyards just below.

Luggers were peculiar in having their topmasts stepped abaft the masts. Caps were fitted top and bottom. Naval boats had cheeks below lower caps, as shown in Fig. 4, and they alone fitted crosstrees, usually double and of short span to spread the topmast shrouds (Fig. 2).

Topmasts were generally kept lowered when topsails were not set, being sent down by a mast rope after the fid was withdrawn.



Sail Plan

Fashions changed with different decades, sometimes lugs were high-peaked, at other times more square. On the bowsprit a large low jib was set; the fore lug tack went to the weather bow. Occasionally the fore topsail was set to windward of mast and tack led to stem head (Fig. 5). Topsails were cut very straight at foot, with little, if any, goring; when necessary, stay passed between foot of sail and yard, as shown in Fig. 4.

Tack of fore and mizen topsails often went to foot of mast, as shown in mizen G, instead of through sheave at yard arm. The yard arms were generally very short, only a few inches beyond the first roving. Nock staysails were rarely fitted, being set on topmast stays. When set the flying jib went to fore topmast head.

Cut sails out from suitable paper, mark in all cloths, bolt ropes, reef bands and points. Smugglers tanned their sails black or dark brown.

Rigging

This was always as simple as possible. Runner tackles were used in preference to shrouds and deadeyes, so that the lee rigging could be easily slackened off. Mizen shrouds set up with luff tackles, deadeyes or runners. Ratlines were never fitted to runners and were seldom used except in the Naval luggers. A burton purchase was frequently set up to a strop put over masthead before the shrouds (Fig. 4) and went to each channel. In the smaller fishing luggers this was single and shifted over to weather side, together with halyards, where they served the purpose of backstays. Topmast shrouds went to channels, and stays to main, and mizen were sometimes, but not always, fitted. The mainstay set up at foot of foremast.

Bowsprit. Pass spar through hole in port bulwark and between bitts, holding with a touch of glue. Lead bobstay 37 up from stem, this set up with either a gun or luff purchase; fall went through hole starboard side and belayed round cleat.

Bowsprit Shrouds 38. These led from horizontal eyes on cranse iron to purchases hooked to

eyebolts on either bow and fall belayed round cleat on bulwarks.

Masts. Step all masts in holes already drilled and glue in position when satisfied they rake at correct angles. Four cleats were usually fitted at foot of fore and main.

Topmasts. These pass through two caps and are held in position by a fid. Two clove hitches of thread glued round make excellent caps.

Runner Tackles. Tie eyesplice in black thread round fore and main mastheads and lead down each side to form pendants of runners 14 and 26 ; a large single block is seized at end. The runner hooks in eyebolt at fore end of channels, reeves through this single block and has a double block at end ; a single block hooks in eyebolt abaft first one and tackle reeves through these blocks (luff purchase) and fall belays inboard round cleat on bulwarks. This was a favourite way of supporting masts with lug or lateen rig, as the lee side can easily be slackened off to give sail more play. The eyebolts had long straps forming the chain plates 40. Deadeyes were preferred by the Navy and three shrouds had ratlines across, and a burton purchase was also fitted (Fig. 4). Mizen shrouds 34 set up with runners, deadeyes or luff tackles.

Topmast Shrouds 15, 27 *and* 34a. Tie bight in long thread round shoulders at topmast heads and lead down either side to the channels, where they set up with luff tackles hooked to eyebolts abaft runners. At mizen they hooked to eyebolt at end of a long strap bolted to outside of hull (Fig. 6). This method was often used in luggers instead of having channels, which tended to impede speed of boat when heeling in fresh wind.

Main Stay 17. This led from lower main masthead cap to foot of foremast, where it was set up with either luff purchase or deadeyes (Fig. 5). A similar stay was sometimes fitted from mizen mast (not shown on sail plan).

Main Topmast Stay 16. Led from shoulder on main topmast, through single block at back of upper cap foremast head, and went to purchase at foot of foremast. This stay was not always fitted.

Fore Topmast Stay 1. Led from shoulder of fore topmast through single block seized to vertical eye on cranse iron at end of bowsprit and led inboard, belaying round bitts.

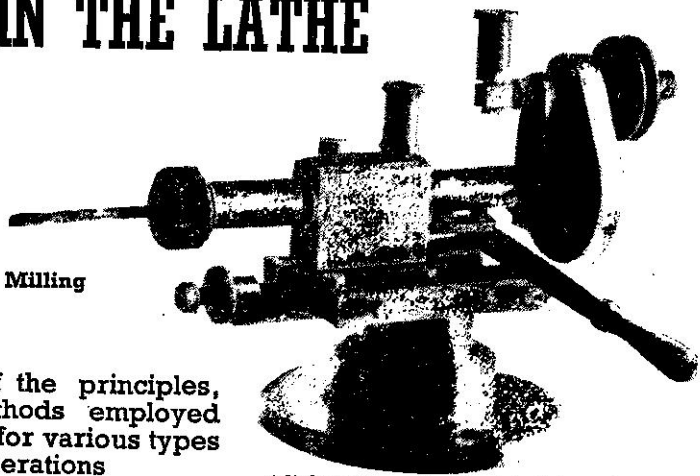
Outrigger. Pass spar through hole in transom, heel rests between bitts similar to bowsprit but smaller, or through gammon iron on thwart just in front of mast.

Outrigger Shrouds 36. Tie bight of thread round score at outer end. Shrouds set up with purchase similar to bowsprit shrouds, and fall led in through hole in transom or aft side of hull and belayed round cleat.

(To be continued)

* MILLING IN THE LATHE

By "NED"



A light milling spindle with slide and sensitive feed, by Mr. K. N. Harris

Section 4—Rotary Spindle Milling Attachments

A general review of the principles, appliances and methods employed for adapting the lathe for various types of milling operations

THERE is scope for design in the bearings of milling and drilling spindles, and many of these have been fitted with contractible tapered bushes, also double cone bearings, single or opposed, and ball or roller radial bearings. It should, however, be observed that the more elaborate the bearing, the more meticulous must be its accuracy of construction and adjustment; and many attempts to improve bearing design have been abortive because of deficiencies in these respects. Ball and roller bearings, in particular, are difficult to apply to real advantage on these simple spindles, with the exception of those used purely to take end thrust. Taking things by and large, the constructor of such an appliance will find that a really well-fitted parallel spindle is hard to beat for general work.

Milling and drilling spindles equipped with special slides and mounting standards may be found advantageous for certain classes of work. A very ingenious example of such an appliance made by Mr. K. N. Harris, for use on a 4-in. James Spencer lathe, is illustrated in the next two photographs. It is designed to fit the cross-slide of the lathe, the base flange of the standard being made to match that of the swivelling top slide, so that it fits the seating provided for the latter. A horizontal slide is provided for the spindle, with sensitive lever feed, and an adjustable travel-limiting stop. The driving pulley may be attached directly to the spindle, or it may operate through the spur reduction gearing, which, as seen in the photographs, is completely enclosed in a casing which clamps on the spindle-bearing housing. Lubricators are provided for both the spindle and the gear-shaft bearings, and a collet chuck is fitted to the spindle to carry drills or milling cutters.

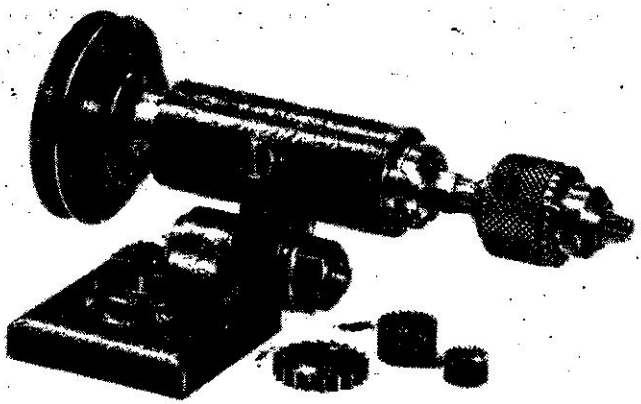
The utility of the horizontal slide and sensitive feed on this appliance is found mainly in connection with fine drilling; for milling, the slide can be locked, and feed applied by using the longitudinal and cross slide adjustments of the lathe.

Mr. Harris's milling spindle in use on a 4-in. Spencer lathe

The Potts Milling Appliances

One of the best-known commercially-made rotary spindle appliances at present on the market is that made by Mr. G. P. Potts, of Ruthin Road, Denbigh, North Wales. The utility of this device, which is extremely well made and finished, though moderate in cost, can be attested to by many readers of THE MODEL ENGINEER. It embodies a hollow spindle, running in closely-fitted

*Continued from page 504, "M.E.," November 21, 1946.



The Potts milling and drilling spindle

bronze bushes, with adjusting and locking collars to take up end play, and a two-step cone pulley for vee belt keyed on the end. The nose of the spindle may be supplied bored to take either No. 1 Morse taper or "A" size collets.

In order to enable the height of the spindle to be adjusted, the spindle housing is attached to the sole-plate by a pivot bolt, which allows it to be swung up or down in an arc around the bolt centre, so that when clamped on the top slide by the tool-post stud, a sufficiently wide range of elevation adjustment may be obtained for most ordinary purposes. It is, however, practicable to increase this range by mounting the complete appliance on a vertical slide, as will be seen later. For lathes which have different forms of tool-post fittings, other than the single stud type, it is possible to adapt the Potts spindle by modifying the mounting bracket or sole-plate, and it is shown here in a form suited to the 3½-in. Drummond or Myford "M" type lathe, which has a large diameter cast pillar on the top slide for the attachment of the tool-post. In this case, a split clamp is provided to mount the milling spindle.

This photograph also shows how jockey pulleys may be supported from the spindle housing, to enable alignment errors in the driving belt to be corrected, or to change the angle of drive. The arm on which the jockey pulley shaft is mounted is pivotally attached to the lug of a split clamp which embraces the spindle housing. Jockey pulley fittings are not included with the standard equipment of the appliance, but are obtainable as extras.

Vertical-Column Milling Attachments

Another useful milling attachment made by Mr. Potts, embodying a spindle similar in general essentials to that described above, is

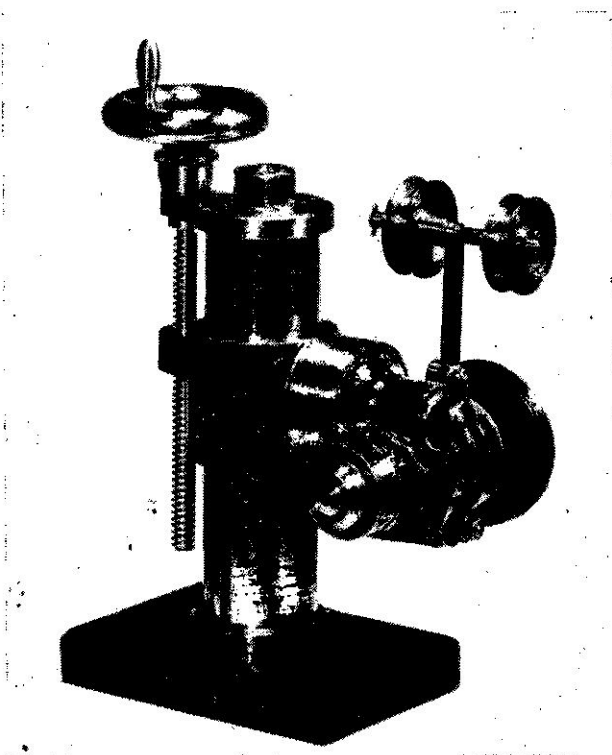
Adaptation of the Potts spindle to fit 3½-in. Drummond "M" type lathe

illustrated in the next photograph. This type of appliance is representative of a class of "vertical column" milling attachments which have been very popular in the past, and have been made in various forms, with minor variations in detail design or equipment, by amateur constructors. It may be said that the Potts attachment embodies all the essential features of its type, and in common with the milling spindle described, is very well made and fitted.

The hollow vertical column which forms the main slide is rotatably mounted by a long centre stud, on a flat baseplate flange, which can be shaped and drilled to mount on the cross-slide of the lathe. On most British lathes, a plain rectangular base, with two bolt holes or slots positioned to match the tee-slots in the cross slide, will fill all requirements; but on some foreign lathes, which do not have the tee-slotted table on the cross slide, a special form of base may be necessary. The sliding bracket is split for fit adjustment or clamping on the pillar, and has a tapped lug which forms the lead-screw nut. A key fitted to the bore of the bracket, and sliding in a keyway running the full length of the pillar, maintains alignment of the vertical traversing movement.

The spindle housing is mounted on the sliding bracket by means of a pivot stud, which provides swivelling movement of the spindle to any angle, and a graduated protractor is provided on the seating flange. It will be seen that this movement, in conjunction with the rotatable movement of the pillar provides "universal" or "spherical" angular adjustment of the spindle.

It may be observed that some attachments of the vertical-column type have been found to lack rigidity, owing to weakness of the column, the bracket, or the means of preventing the latter from rotating on the column. The use of a sliding key, of limited size, to take heavy torque stresses in the slides of machine tools, is a feature which has often been strongly criticised as inherently unsound, but a great deal depends on details of design, and even more on the way they are carried out. A column of prismatic form would probably be more rigid against torque stresses; but it would also be much more expensive and difficult, both to machine and fit, than the round column, which accounts for the popularity of the latter in milling attachments employed in amateur workshops.

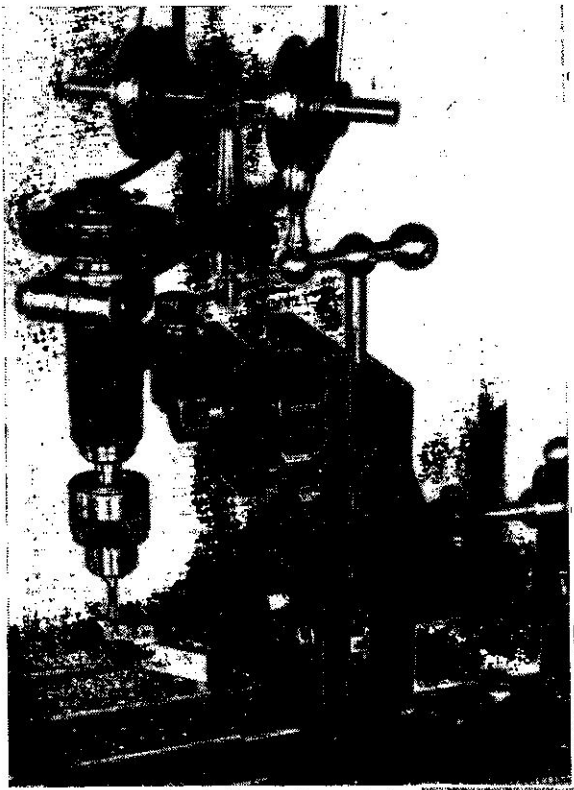


Potts milling attachment with cylindrical vertical slide

Milling Spindle Arrangements

Some highly ingenious and practical applications of the Potts milling spindle have been devised by Mr. Ian Bradley. These have already been described by him in THE MODEL ENGINEER, but in view of the way in which they demonstrate essential principles, it is hoped that no apology will be necessary for bringing them once more to the notice of readers. Mr. Bradley uses the simple form of the Potts milling spindle, mounted on a standard Senior non-swivelling vertical slide, for the particular examples of operations illustrated here. It will be seen that the range and adaptability of the equipment are further extended by the use of a slotted plate of mild steel, introduced between the sole-plate of the milling spindle and the table of the vertical slide. The gear wheel seen in two of the photographs is simply a scrap component, utilised as a parallel distance piece to increase the effective range of overhang in front of the vertical slide. A very neat form of jockey pulley mounting will be observed, consisting of a split clamp on the spindle housing, with a long stalk attached, on which is clamped a vertical pillar carrying the jockey pulley shaft.

The first example shows the assembly mounted on the cross-slide of the lathe, with the spindle vertical, so that it can be used for vertical milling operations on work held in the lathe chuck; in the particular case shown, it is cutting a keyway in a shaft. As already described, this operation can be done without a rotary-spindle appliance, by running the cutter in the lathe



Arrangement of spindle and vertical slide, with work mounted on cross slide

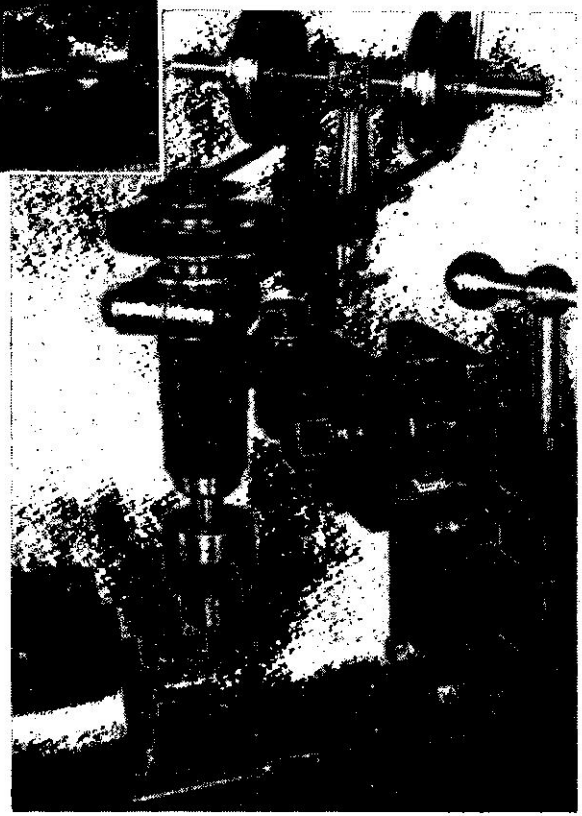
chuck and mounting the work on the cross slide, but the particular advantage of a vertical spindle is that it facilitates observation of the work, and in many cases simplifies setting up and holding, especially if it is desired to make angular or indexing adjustments around the work centre.

It will readily be seen that with the assembly set up as shown, milling could be carried out on a piece of work mounted rigidly on the lathe bed, as the longitudinal, cross, and vertical adjustments are all available for moving the cutter spindle. Automatic traversing feeds, as provided on the lathe, are also available for feeding the cutter.

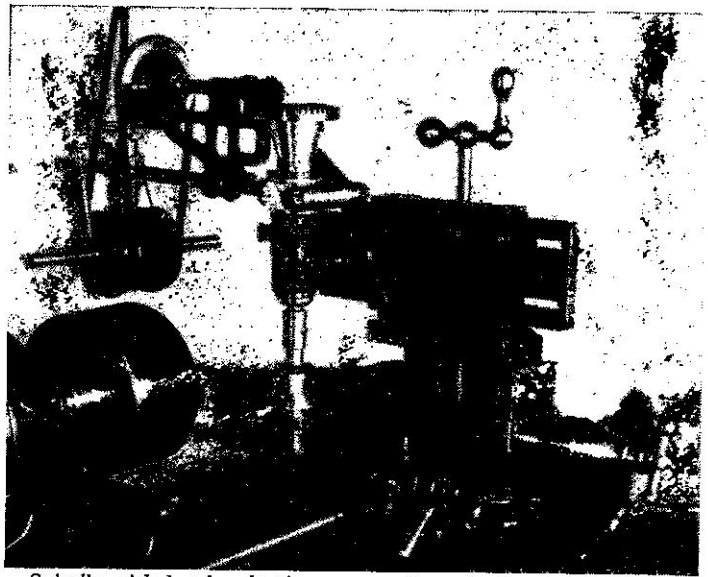
In the second example, the assembly is mounted on a parallel packing block on the lathe bed, to the right (*i.e.* tailstock side) of the saddle, in which position it is available for vertical milling of work clamped to the cross slide, as shown. The driving arrangements are exactly as before, and again, any automatic feeds with which the lathe may be equipped, are available. In both these examples, the spindle is not restricted to the vertical position but may be set at any angle, or even in the horizontal position, if desired.

The third example shows the assembly again mounted on the cross slide, but in this case it is arranged for dealing with a heavier milling operation—namely, spur gear cutting—for which a reduction gearing in the spindle drive is desirable. This is provided in a very ingenious manner, by pressing into service the components of a small hand drill, including the bevel gears, which are in this case used in the reverse way to that originally intended, that is, to obtain a reduction instead of an increase of speed. The drill frame, with its spindle and bevel pinion, is mounted on the jockey pulley arm, and the crown wheel, by means of a suitable adaptor, is attached to the milling spindle. No alteration is made to the jockey pulley fittings, but the spindle is underslung from the arm to suit the particular driving arrangements employed.

The milling cutter is carried on an arbor which fits the socket of the spindle, and in order to support the lower end of the arbor, an outrigger bearing is



Mr. Bradley's adaptation of the Potts spindle for use on vertical slide



Spindle with bevel reduction gear and steady bearing for use in cutting spur gears

arranged, in an arm bolted to the rear end of the cross slide, alignment of this bearing being adjusted before final clamping down. As the cutter works at a fixed height for this operation, exactly level with the lathe centres, no working adjustment of the vertical slide is required, and once set, the slide gibs may be tightened up to prevent inadvertent movement. The outrigger bearing is equipped with a lubricator, and immediately above it, a conical collar is fitted to the arbor, to deflect swarf and dust which might otherwise get into the bearing.

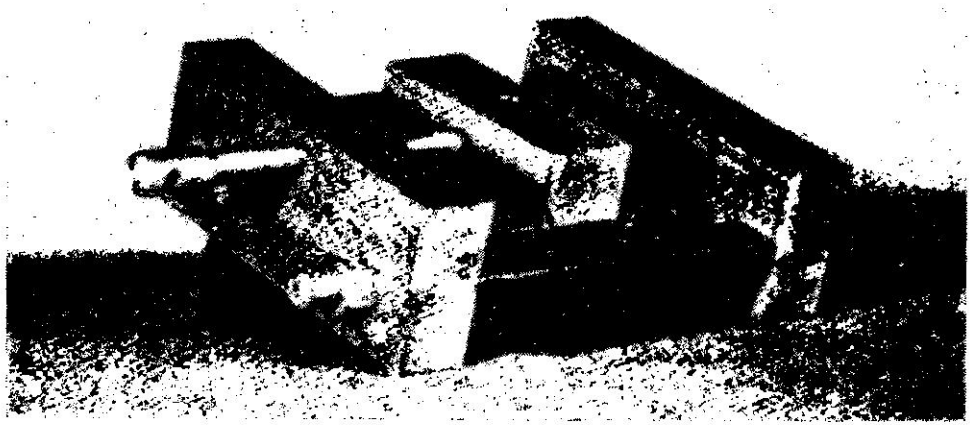
Other forms of milling spindles or cutter frames may be adapted to work in similar ways to that shown here. To those readers who question the utility of lathe milling appliances, the quality of the work turned out by Mr. Bradley, and other model engineers who use these methods, should be a sufficient answer.

(*To be continued*)

A MACHINE VICE

I HAVE a small "Adept" shaper, a useful machine, but it is difficult to mount an ordinary machine-vice on its table; that is if one wishes to insert a piece of work of the maximum possible size. To get over this difficulty, I devised the vice shown in the photograph. It is shown fitted to the machine table. The bolts securing the end plates pass through the tee slots. The rest of the construction is clear from the photograph.

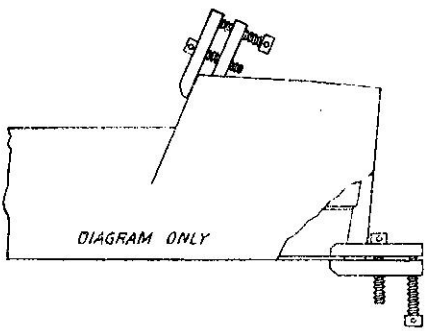
This type of construction could be adapted to other small machine tables (vertical slides, etc.). It could be modified in various ways to suit particular circumstances; the essential feature is the retaining of the whole surface of the table on which to place the work.—P. GRANGER.



"Hielan' Lassie" By "L.B.S.C."

How to Fit Firebox to Shell

BEFORE starting on the assembly job, beginners would be well advised to take a good look at the longitudinal section of the boiler shown in the October 24th issue. If you have not bent out the front of the firebox plate as shown, but have left it straight, as given for an alternative, a piece of ½-in. square copper rod, cut full length between the throat plate flanges, should be fitted at the bottom of the throat-plate. Both throat-plate and rod should be well cleaned. If the firebox plate has been bent outwards as shown, clean the contact-surfaces, also the tops of the girder stays and the inside of the wrapper sheet. Lay the boiler shell on the bench on its back and slide the firebox and tube assembly into it until the front plate of the firebox comes up against the throat-plate, or piece of copper rod according to which method of construction was



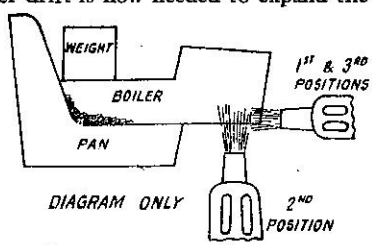
How to assemble firebox in shell

used. Put a toolmaker's cramp on at each end, to hold the parts together. Now see if the flanges of the girders on the firebox are in full-length contact with the wrapper; this is important, and if they need any adjustment to get them in the required position, do this right away. Also, see that the firebox is central in the shell; that is, an equal distance at each side, between the side of the firebox and the adjacent wrapper sheet. Put another toolmaker's cramp over the edge of the wrapper and one of the girder stay flanges to keep the lot in close contact. Put a few 3/32-in. copper rivets along the joint between throat-plate and firebox plate, at about ½ in. centres, to keep the parts in close contact whilst brazing. The clamps can then be removed.

Drill a few holes with No. 41 drill, say, at about ½ in. centres, through wrapper and crown-stay flanges; file off any burrs inside and put a few 3/32-in. copper rivets through these joints also. Personally, I put these rivets in by the aid of a strip of metal with a notch in the end like a distant signal; the rivet is jammed in the notch, and is held quite tightly enough to permit inserting, even to the extent of pushing past a slight burr. For a dolly I use a piece of ¾-in. by 1¼-in. iron bar held horizontally in the bench vice, and, to prevent the bar slipping down, or having to wrench the vice handle hard enough to strip the screw, I just take out one of the inset jaws (removed by taking out two screws) and rest the bar on the ledge which supported the jaw. Just a moderate pressure of the other jaw on the bar then holds it quite firmly. When the rivet-shank appears through the hole on top of the wrapper, put your finger against it, pull away the "distant signal," slip the wrapper over the bar—but don't let the rivet slip out, or the dictionary of railroad Esperanto may need yet another addition!—and then "head" the rivet with the ball end of the hammer-head. No need for either contersinking or snapping the head, as the lagging will cover it; but take care not to deface the copper, all the same! Ditto repeato until all the rivets are in and the firebox is firmly held in position by throat-plate joint and stay-flanges; then turn your attention to the front end.

How to Fit the Smokebox Tube-plate

The flange of the tube-plate and the inside of the barrel, also the tube ends, should be quite clean. Insert the tube-plate flange first; this is the opposite way to full-size practice, but the big engines usually have the smokebox tube-plates riveted in. We need no rivets here at all. Very carefully tap the tube-plate down until it almost touches the tube ends; then, with a wooden skewer or a blacklead pencil, line up each tube with its respective hole in the tube-plate. The firebox ends of the tubes will be quite soft by virtue of the silver-soldering job and will readily yield to gentle coaxing. When all are nicely in line, tap down the tube-plate until all the tubes project through the holes about 1/32 in. A taper drift is now needed to expand the tube



How to braze crownstay flanges to wrapper

ends to a tight fit in the holes; a piece of ⅜-in. round steel can be tapered off like a drill-shank for the small tubes, and a larger diameter piece for the flues; or you can use one big piece tapered down sufficiently for the lot. I have a few tapered tool shanks (relics of the 1914-1918 world insanity) which are hardened and polished; they make fine drifts. Grease the drift and drive it into each tube in turn; give it a tap sideways if it tries to stick. The lot is then ready for silver-soldering or brazing; meantime, smear some wet flux along the top of each girder flange inside the wrapper for its full length, both sides.

The Next Brazing Operation

When doing the joint between tube-plate and barrel, Sifbronzers won't need any extra precautions, the job being done by the drop-by-drop method already described ; but brazers will need the following easy rig-up. Get an old tin tray or box lid, or knock up a shallow tray, about 8 in. square, from a bit of sheet iron ; doesn't matter how rough it is. Cut a hole in the middle big enough to admit the boiler barrel ; up-end the boiler and put the tray over it, about 3 in. or so down. If not tight enough to " stay put," prop it up with a couple of bricks or tiles or anything that may be handy. Pile some coke or breeze in it around the barrel to the level of the tube-plate. Put some wet flux all around the circumferential joint, and also around the tubes, and plug the tube ends with little wads of asbestos flock or string, pushing same about ¼ in. down. Put some little bits of silver-solder among the tube ends (Easyflo or whatever you are using) or else use Mr. Hearn's wheeze of rings of Easyflo wire.

Now get busy with your blowlamp and heat up the whole boiler end, coke and all, to dull red ; then concentrate on one point of the circumferential joint (I'm getting fond of that word, by the look of things !), blow it up to bright red, apply spelter stick as described in first operation, and work your way right around. Don't forget that a taste of coarse-grade silver-solder acts as a fine " starter " if the brazing material is a bit shy of melting. Keep the heat well up, and you'll find that a nice even fillet can easily be made right around the whole circle. Sometimes the whole tube-plate and tube ends will glow dull red whilst doing the above job, and the silver-solder around the tubes will start melting of its own accord ; if not, play the flame direct on the nest of tube ends until the silver-solder has melted and formed a ring around every tube. Don't forget to apply the scratch wire if there is any sign of bubbling. otherwise pinholes may result.

Next, quickly knock off the small tray, and lay the boiler on its back in the brazing-pan, with the wrapper overhanging the edge. You will probably have to put a brick or something on the barrel, to prevent it tipping up. Lay a strip of coarse-grade silver-solder each side of each stay flange, and close to it. Blow the flame partly inside and partly underneath, until the stay flanges and wrapper glow dull red, then blow full pressure underneath, on to what would be the top of the wrapper if the boiler were right way up. This will melt the silver-solder strips and start them running. In the days before I took to oxy-acetylene and Sifbronze, I used to do this job with two blowlamps, using my big five-pint underneath and blowing on the inside with the smaller one-pint ; this made the silver-solder run like water, and then I used to feed in some " Lafitte " strip until there was a big fillet each side of the crown-stay flanges. Eh ? Oh, no, I'm just a human being, not a four-handed gorilla, nor an octopus ! The big blowlamp was just propped up in position with anything handy, leaving both hands free, one for the small blowlamp and the other for manipulating the small tongs holding the strip of spelter. I often wished I *did* have more than two hands, and it's a good job I can use both with equal facility when working. I learned that trick in the far-off days when I had my long curls. Anyway, to do it with one blowlamp, just get the wrapper hot enough to make the silver-solder run, then shift the lamp so that you blow on the end, the flame going partly inside and partly outside, like blowing on the throat-plate flange at the bottom corner ; this should keep the whole lot hot enough to allow some easy-running strip to be melted in along with the silver-solder, to form the necessary fillet on *both sides* of each crown-stay girder. Critics of my method of crown staying always insist that the flanges will tear away from firebox and wrapper ; with a spelter fillet each side, this is impossible, as they are the strongest part of the whole job and, if properly done, the copper sheet itself would tear away before coming adrift from the flanges.

Let cool to black and repeat the pickling and cleaning process ; and be mighty careful of splashes. The boiler is now becoming a tidy handful, and it is easy to let it slip when " baptising " it in the pickle-bath. I have not forgotten that we didn't do the throatplate-to-firebox joint ; that is done on the final job of brazing the backhead and foundation-ring. The next job will be fitting those parts ; and all being well, will form the subject of the next instalment.

"Juliet"

Valve-gear

I hope builders of " Juliet " won't think I have forgotten all about cylinders, and am expecting the engine to run on her reputation, like the well-known automobile which finished its journey after the engine dropped out ; but as you can't press on the driving wheels until the eccentrics and stop-collars are mounted on the axle, and it only needs two straps and rods to complete the valve-gear, we might as well finish the job and be done with it ! Then, when the cylinders are made and erected, all you have to do is to put a pin in each valve spindle fork, set the valves, couple-up your tyre-pump, and enjoy a foretaste of the reward that sweetens labour.

Both eccentrics and stop collars are just kiddy's practice jobs. An odd end of 1¼-in. mild-steel shafting is the best thing you could have for the eccentric-sheaves, or tumblers, as they are usually known among enginemen. Simply chuck in three-jaw, face the end, turn down ¼-in. length to 1⅛ in. diameter, and part off to leave a $\frac{1}{16}$-in. flange. Beginners, take care to get the smoothest possible finish. The tool marks will indicate the true centre. Scribe a line right across the tumbler, cutting through the centre ; on one side of it make a centre-pop $\frac{3}{16}$ in. away, and on the other $\frac{5}{16}$ in. away. Drill them both No. 32 and be careful that the drill goes through dead square. Far and away the best plan for a beginner would be to mark-out on the flange side, chuck in four-jaw with the centre-pop for the pinhole running truly, put a No. 32 drill in the tailstock chuck, and poke it straight through ; then shift the tumbler until the pop for the axle hole runs truly, put the No. 32 drill through that, then open out with a ¼-in. drill in the tailstock chuck. If your tailstock won't take that size, use the biggest it will take and open out with a little boring tool until a piece of ½-in. round steel just slides in

without shake. This gives more accurate results than putting the big drill in the three-jaw and the work against a piece of wood on the tailstock drilling-pad. Wood isn't always parallel both sides! If you have a bench or pillar drilling-machine, put the eccentric in the three-jaw, take the chuck off the lathe and set it on the drilling-machine table, as an alternative to chucking in the four-jaw. Drill in the usual way, the chuck acting as a circular machine-vice. Drive a piece of $\frac{1}{8}$-in. silver-steel into the small hole, file it so that it projects barely $\frac{1}{8}$ in., and that's that.

For the stop collars you can either use the $1\frac{1}{4}$-in. steel rod or a piece of $1\frac{1}{8}$-in. brass rod. Chuck in three-jaw, face, centre, drill first with No. 32 or $\frac{1}{8}$-in. to about $\frac{5}{8}$ in. depth, open out with a $\frac{1}{2}$-in. drill, and part off two $\frac{1}{4}$-in. slices. A segment of each is milled, or sawn and filed away, as shown. Drill a No. 40 hole in the thickness remaining and tap it $\frac{1}{8}$-in. or 5-B.A. for a set-screw.

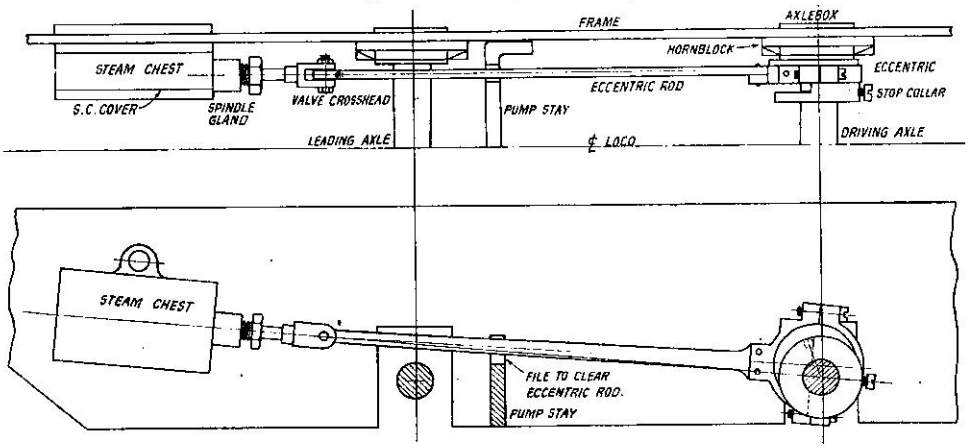
Fitting Eccentrics and Quartering Wheels

The pump eccentric goes in the middle of the driving axle; put a stop-collar each side of it, and then the tumblers, flanges outwards, the axleboxes between them and the wheels. If you have already pressed on one driving wheel, "thread" the axle in the following order: axlebox, eccentric with flange next box, stop-collar with gap next pin, pump eccentric (boss can be either side), stop-collar with gap away from pump eccentric, tumber with pin next stop-collar, axlebox, and the other wheel. Set the crankpins at right-angles as near as you can "by eye"; then stand the assembly on something level (lathe-bed will do) with a chock each side of wheel to prevent rolling. Set a try-square alongside one wheel, and adjust wheel so that edge of blade passes over centres of axle and crankpin Set the needle of your scribing block or surface gauge to the centre of axle on opposite side, and adjust wheel on axle until centre of crankpin is at same height; then press the wheel home. The whole assembly can then be re-erected in the frames and the hornstays replaced. If you haven't already quartered the leading pair of wheels, do it now, and the coupling-rods (details already given) can be put on "for keeps." With the axle boxes in running position—that is, with a bit of $\frac{1}{8}$-in. rod jammed under each box, between it and the hornstay—the wheels should spin freely without any sign of the rods binding. If they bind, you haven't got the quartering correct on both pairs of wheels, and the remedy is to shift one wheel slightly on its axle until the rods run freely. When O.K., drill a hole about $\frac{3}{8}$ in. deep with No. 32 drill, half in axle and half in wheel boss, and drive in a stub of $\frac{1}{8}$-in. round steel, to act as key in each wheel. File off flush with boss. This eliminates any tendency for the wheel to shift on the axle, but doesn't interfere in the slightest with the easy removal of the wheels, should it ever become necessary, *e.g.* for re-turning treads after wear.

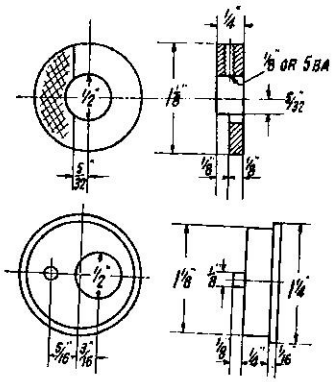
Eccentric-straps and Rods

Eccentric-strap castings as specified for my G.W. "1000" and engines of similar size, are available from our advertisers, and are machined up as fully described for "Petrolea." Briefly, clean with a file, centre-pop and drill lugs through with No. 40 drill, and saw each strap in half, using vice top to guide sawblade, and marking each pair of lugs so that they can be replaced "as you were." Smooth off saw marks, tap the lugs on the rod half $\frac{1}{8}$-in. or 5-B.A., and open those on the plain half with No. 30 drill. Screw the halves together, chuck in four-jaw with the hole (now oval) running as truly as possible, and bore to fit exactly on sheaves. Face one side whilst still in chuck, and the other with the strap mounted on a stub mandrel in three-jaw. The lug for attachment of the eccentric-rod is sawn and filed or milled to half its thickness, and don't forget one has to be milled on the right-hand side and one on the left, otherwise you will have one eccentric with the oil-box upside down, and I just hate to imagine what the driver would say when he went underneath with his oil feeder!

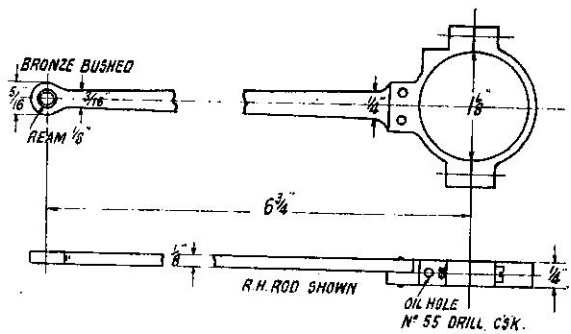
The eccentric-rods are filed up from $\frac{1}{2}$-in. by $\frac{1}{8}$-in. mild-steel to the shape shown in the illustration. They are attached to the lugs on the straps by a couple of $\frac{1}{16}$-in. iron rivets, and you



Valve-gear for "Juliet"



Stop-collar and eccentric



Eccentric-strap and rod

can solder them as well, as a precaution against the rivets working loose. The other end is drilled $\frac{3}{16}$ in. and has a bronze bush squeezed in, said bush being drilled No. 33 in the lathe before parting-off and reamed $\frac{1}{8}$ in. after being pressed home in the eye of the rod. Put the straps on the sheaves with the oil-holes uppermost and the rods nearest the frames, as shown in the plan view of complete gear, and file a clearance each side in the upper part of the pump stay, to allow the rods to line up with the centre of the openings for steam chests, plus a little for the up-and-down movement of the rods when the engine is at work. The correct adjustment of the stop-collars cannot, of course, be made until the cylinders are erected, and I'll tell you how to do it later on. Meanwhile, a word in season.

I learn a dickens of a lot from my correspondence, and have been informed by many beginners, especially those who are newly-joined club members, that the loose eccentric valve-gear is not a "proper" gear, and only fit for toyshop productions. Nothing could be farther from the truth. As I have explained, this gear, out of all the two-hundred-odd gears that have been devised to operate the valves of a locomotive or stationary steam engine, is the *only* one that will give equal port openings at each end of the cylinder in both directions. With one solitary pin-joint between the eccentric and valve, wear is indefinite, and accuracy of setting retained; and for an engine of the type we are building, I say unhesitatingly that it cannot be beaten. The fact that you have to push the engine to reverse it is of no moment on a continuous track; and on the sharp curves of a suburban back garden, with a good load behind the engine, the fixed cut-off point which I shall specify, with adjustment of regulator opening, will give results as economical as a link-motion notched up with a wide regulator opening.

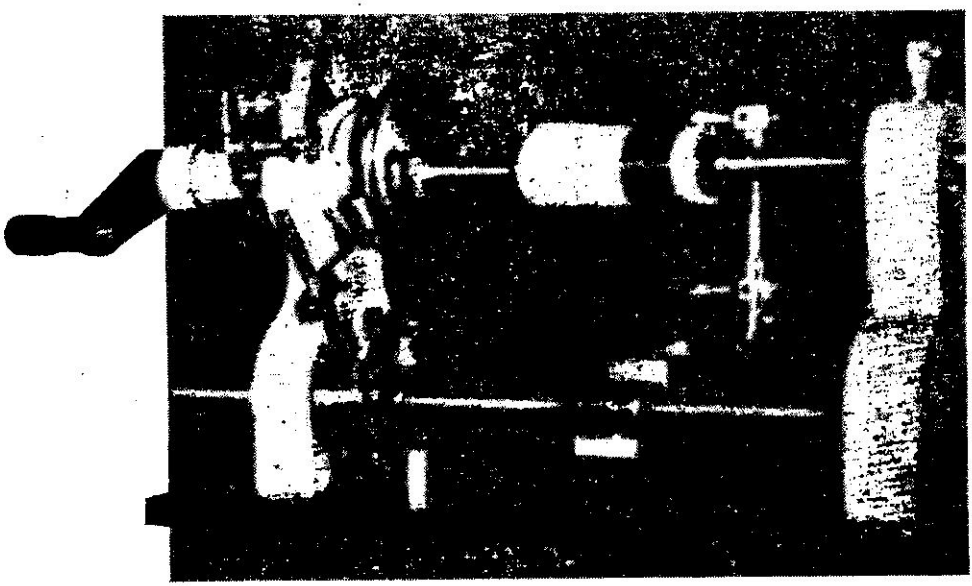
At the same time, for a shunting job, such as running up and down a short straight road, a lever-operated reversing gear would be more handy; and on a long continuous road with easy curves, free from the hard "collar-work" and continual flange-grinding of the garden line mentioned above, a very early cut-off would prove more economical in fuel and water. Therefore, if anybody wishes to build the engine with a full link-motion, I shall be only too pleased to give the necessary alterations. I strongly recommend all beginners to fit the loose eccentric gear as described; then later on when they have gained experience both in construction and operation, they can, if they so desire, easily add the extra parts required to convert the gear to link-motion. The next instalment will deal with the cylinders.

For the Bookshelf

Trigonometry Made Plain. By G. P. Rawlings. (London: Percival Marshall and Co. Ltd.) Price 5s. od. net.

A working knowledge of trigonometry is useful, if not essential, in the workshop as well as to the technical student; and here is a lucid little textbook that should command a wide demand. It avoids the usual fault of plunging straightway into a learned dissertation; but it leads the reader, step by step, by way of much useful groundwork, up to a clear explanation of what trigonometry is. Then, and only then, does it give any information upon how trigonometry can be practically applied; and many readers may be surprised to learn that its application covers such varied subjects as: Workshop drawings, mechanical engineering, map making optics, radio, mechanics and navigation. The author's style of writing is clear and very easily understandable, with the additional advantage that the book is obviously the result of practical knowledge of the subject.

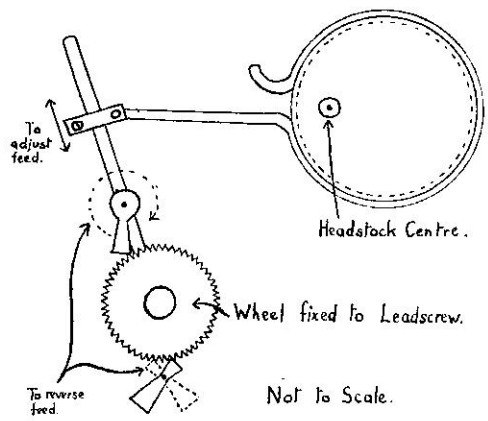
Hand-Operated



Coil Winder

IT is comparatively easy to feed wire regularly on to a truly-revolving former if the wire is not of too fine a gauge. If the wire is finer than 30 s.w.g. enamelled, however, the work becomes insufferably tedious. This is, of course, on a hand-turned machine and, assuming that a desirable speed is about 120 turns a minute. To get over the difficulty of winding the finer gauges, I made a machine for winding wire from 36 s.w.g.

The machine is lathe-like in form but with the headstock to the right. The headstock bearings and spindle consist of a front wheel cycle hub with one flange removed; the other flange is used for fixing purposes. The bed is $\frac{3}{4}$-in. bar and the tailstock has a plain sliding centre. The leadscrew is screwed $\frac{3}{8}$-in B.S.F. A turns counter is mounted on the headstock. On the bed slides the carriage, a plain "chunk" of mild steel, bored to fit the bed. Attached to the slide is a brass nut for the leadscrew. Two brass wheels are also mounted on the slide over which the wire passes.



The feed arrangement was borrowed from that seen on planers and shapers. This method has disadvantages; it is intermittent, it is poor for high speeds and it is sometimes uncertain. None of these things greatly mattered for my purpose and the advantages, simplicity, easy reversal and the ability to obtain many rates of speed were of paramount importance. It is fitting to say here that, when winding fine wire, it is unnecessary to keep exactly to the number of turns per inch specified by the manufacturers when adjusting the feed. Wire tends to wind itself regularly. With a former length of 2 in. it is possible to wind 36-s.w.g. enamelled wire with a feed of, say, 120 turns per inch while the wire is actually laying 117 turns per inch. The sketch shows a simplified drawing of the feed mechanism. With a 20-t.p.i. leadscrew and a 48-toothed wheel I obtain the following speeds: 960-480-320-240-192-160-137-120-107 and 96 turns per inch. In the photograph, wire is being wound at 240 t.p.i.

It must not be disguised that winding a coil of many thousands of turns of fine wire by hand-turning, even with automatic feed, is still tiresome. But to a man with some patience and with this apparatus it is possible.—P. GRANGER.

Letters

The Tuxford Engine

DEAR SIR,—I would venture to criticise the model "Tuxford" engine on the cover of the October 17th issue, in respect of the very strange flywheel fitted to it, which seems better suited to a higher-speed engine of much later date.

At the time when these engines were built, flywheels of the type I have sketched were in general use, these examples being based on plates in the article "Steam Engine," in the *Popular Encyclopedia* (Blackie, 1876).

Messrs. Tuxford also built strange portable engines, where the chimney was placed directly over the firebox, illustrations of these will be found in old agricultural journals, and also I noticed them in the *Illustrated London News* for 1855. It appears that some form of return-flue boiler was employed in these engines.

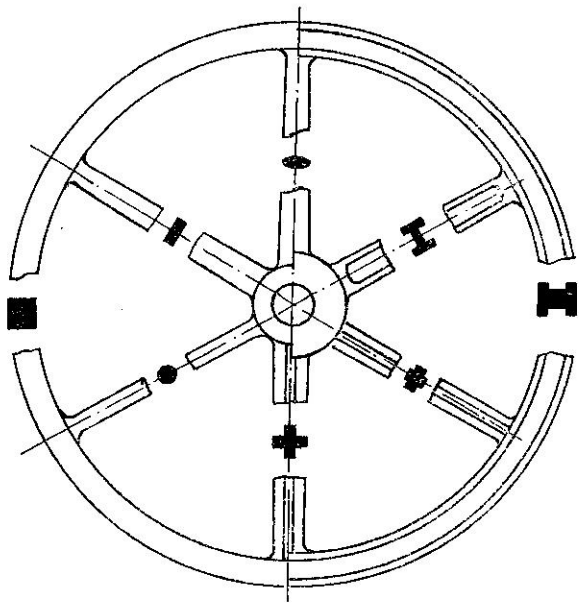
Yours faithfully,
H. N. NICHOLLS.

London, N.W.

Steam Consumption of Turbines

DEAR SIR,—May I be allowed to reply to Mr. K. N. Harris on the subject of steam consumption of turbines. I would suggest that in the case of the V2 rocket, the question of steam consumption was one of the last considerations in the minds of its designers. Imagine for a moment, the size of a 600 h.p. reciprocating engine—and the size of the rocket that would be necessary to carry it as part of its auxiliary equipment! Weight must have been a much more important point. Further, this turbine was used to drive two directly coupled pumps that dealt with vast quantities of fuel and liquid oxygen during the short period of powered flight, and by reason of the high rotational speeds attained, these again were very small and light in weight for the duty performed.

Finally, it would be almost impossible to improve upon the sheer simplicity of the whole scheme. These points, I think, came before efficiency and I would prefer to call it effectiveness for the job in hand.



Sketch showing sections of rims and spokes of flywheels used on old beam and table engines, etc. Based on plates in "Popular Encyclopedia" (Blackie, 1876)

Nevertheless, the point raised is very interesting because it must be borne in mind that the V2 turbine is a single wheel machine with no interstage reheating, etc., employing a large adiabatic heat drop and high efficiencies are not usually obtained under these conditions without very high wheel speeds, and it is exhausting to atmosphere and not into a high vacuum as in the case of the engine with which he attempts to compare it. I have yet to hear of a reciprocating engine that uses less than about 35 lb. per b.h.p. hour under similar conditions, and I think the 18 lb. quoted is very good going.

What Consumption

All this is somewhat beside the point anyway, and it serves no useful purpose for me to quote figures for modern turbine installations where 6 lb. per b.h.p. per hour are usual, a figure which no reciprocator can approach, because of its inability to make effective use of the last two inches or so of vacuum. What matters surely is the consumption of our models of these larger machines. I have two turbines, one consumes 0.625 oz. of steam per minute at 60 p.s.i., and gives 0.0142 h.p., the other 0.25 oz. per minute and gives 0.006 h.p. or 165 and 155 lb. of plain dry steam per b.h.p. per hour respectively. On the face of it they do not appear to be very efficient, but then, no small mechanism ever is, and I would like to know if Mr. Harris has a small steam engine of similar size of which he has measured the power developed, and if so, would he please ask the Editor to publish the result.

Yours faithfully,
WALTER H. ELKIN.

St. Albans.

Making a Back-plate

DEAR SIR,—I would like to point out to "Toolmaker," with reference to fitting a backplate to a self-centring chuck, on page 402, all the self-centring chucks I have seen and fitted have the bolting screws on the outside face (a) and this being so, should be the point of contact of the two faces and not at (b), the four-jaw independent chucks are fitted to face (b), and the face (a) is not required. Why carry extra weight when it is not required?

Yours faithfully,
W. W. ELLIS.

Chester.

Clubs

The Kent Model Engineering Society

The talk on "Rebuilding a Small Lathe," given by Mr. Sherwood, on November 18th, was very interesting and instructive.

The following weekly meetings have been arranged: December 9th, "Film Show." December 16th: Mr. Biffin, "Rebuilding a Milling Machine." December 23rd: "Ten minute Talks by members." December 20th: "Competition Night."

Anyone interested in model engineering is welcome to any of our meetings.

Hon. Secretary: A. F. BROCK, 342, Green Lane, New Eltham, S.E.9.

The Women's Engineering Society

At the November meeting, held at The Engineers' Club, Manchester, Mr. J. A. Taylor, M.Sc.Tech., A.M.I.Mech.E., gave an interesting talk on "Textile Machinery," illustrated by numerous slides, showing the different processes through which the raw cotton passes before leaving the spinning mill.

The next meeting of the society will be held on December 12th, when Miss A. G. Shaw, M.A., M.I.P.E., (member of the W.E.S.) will give a talk on "Motion Study."

Hon. Secretary: MISS S. M. F. WADDELL, B.Com., 82, Park Hills Road, Bury.

Stockport and District Society of Model Engineers

Friday evening, November 15th, proved a great success for Mr. Browne and his practical demonstrations of moulding.

December 6th, Mr. Whiston will talk about "Crewe Works and After." December 20th, Mr. Terry will demonstrate his model of H.M.S. *Exeter*. January 3rd, Mr. Gerrard will talk about and demonstrate his model steam turbines. January 17th, a bits and pieces evening. February 1st, Mr. Jones will complete his talk about his model *Javelin* destroyer, this time dealing with the ship itself.

Lone hands and visitors are welcome at any of our meetings, held in the Dyers and Bleachers Club, Tiviot Dale, Stockport, first and third Fridays in each month, at 8.0 p.m.

Hon. Secretary: E. TERRY, 17, South Parade, Bramhall Lane, Stockport.

Exeter and District Model Engineers' Society

The society is now well under way, having been reformed over a year; also, a large multi-gauge track is under construction for 1¼-in., 2½-in., 3½-in. and 5-in. gauges, and is 135 yards long.

New members are welcomed, all enquiries being made to the hon. secretary.

Our programme till the end of May, 1947, is: December: 7th, Mr. Oldridge, (member), taking members over the "Accident Prevention Dept.," of the police headquarters; 21st, Free and easy night. January: 4th, Annual general meeting, for the election of new officers, etc.; 21st, free and easy night. February: 1st, Mr. Roche, (member), talk on "Painting and Lining Your Models"; 15th, free and easy night." March: 1st, Mr. Rodgers, (member), talk entitled "Prototype Locomotives" 15th, free and easy night. April: 5th, Dr. Mackie, (member), arranging for a speaker on "Television"; 19th, free and easy night May: 3rd, Mr. Gunn, (member), speaking on "Model Locomotives."; 17th, free and easy night.

All meetings are held in the Lecture Room of St. Luke's College, Exeter, the time, 7.0. p.m.

Hon. Secretary: G. W. BELL, 44, Retreat Road, Topsham, Nr. Exeter.

York and District Society of Model Engineers

The next meeting will be held on December 7th, in No. 11 room, Co-op Hall, Railway Street, at 7 p.m. sharp. Discussion: Setting cranks at 90 degrees.

Hon Secretary: W. SHEARMAN, 28, Terry Street, York.

Enfield and District Model Engineering Society

We are holding a model engineering exhibition on Saturday, December 14th, 1946, in the Powder Mills Canteen, Powder Mills Lane, Waltham Abbey, where we hope to meet old friends and make new.

We shall be pleased to welcome anyone interested at our meetings on alternate Wednesdays, as from December 11th, 1946, at "The Alma," Ordance Road, Enfield Highway, at 8.0 p.m.

Hon. Secretary: C. H. PEARCE, 5, Morley Hill, Enfield, Middlesex.

Mansfield and District Model Engineering and Handicrafts Society

At the usual weekly meeting held at the society's new workshop, at New Lane, Stanton Mill, on Thursday, November 14th, Mr. J. Wade brought with him the complete set of flanged plates for the society's "Midge" locomotives under construction. These plates have been flanged hot by Mr. Wade, under a power press. Regarding workshop equipment, we have now got a new line countershaft running and work is now going forward in regards to extra lighting and power points, this work being done by Mr. C. Nicholson.

Hon. Secretary: J. CORBETT (Lathes), Stanton Mill, near Mansfield.

NOTICES

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The Editor invites correspondence and original contributions on all small power engineering and electrical subjects, which should be addressed to him at 23, Great Queen Street, London, W.C.2. Matter intended for publication should be clearly written, and should invariably bear the sender's name and address.

Readers desiring to see the Editor personally can only do so by making an appointment in advance.

All correspondence relating to sales of the paper and books to be addressed to THE SALES MANAGER, Percival Marshall and Co. Ltd., 23, Great Queen Street, London, W.C.2.

Correspondence relating to display advertisements to be addressed to THE ADVERTISEMENT MANAGER, "The Model Engineer" 23, Great Queen Street, London, W.C.2.

"THE MODEL ENGINEER"
SALES AND WANTS

Private: **Threepence** *word.* *Trade*: **Sixpence** *word.* *Use of Box* **2/6** *extra.*
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TOOLS & WORKSHOP

Buck and Ryan's Department for Lathes, Drilling Machines, Grinders, Electric Tools, Chucks, Surface Plates, Lathe Accessories and Tools.—310-312, Euston Road, London, N.W.1. Telephone: EUSton 4661. Hours of Business: 8.30 to 5.0 p.m., Monday to Friday; Saturday, 1.0 p.m.

Split Chucks for Watchmakers' Lathes, 6 mm., 6½ mm., and 8 mm., at 7s. each, postage 6d.—JOHN MORRIS, 64, Clerkenwell Road, London, E.C.1.

Infinitely Variable Speed Gear, ratio 16 : 1, material supplied, leaflets.—CROWTHER, 85, Charlotte St., Rochdale.

"Little John" Lathes. Sole Selling Agents for Home and Export. Send for illustrated literature and orders to—THE ACORN MACHINE TOOL Co. (1936) LTD., 610/614, High Road, Chiswick, London, W.4. Telephone: CHIswick 3416-7-8-9.

Bench Lathes, Bench Millers, Pedestal Drills, Myford Spares, Lathe Tools, Milling Cutters, Slitting Saws, Chucks, Micrometers, small Tools for delivery from stock.—F. W. KUBACH, 12, Sylvan Road, Upper Norwood, London, S.E.19.

40 T.P.I. Ground Thread Taps, 3/16" to ¼", ready shortly. Enquiries to—ESSEX ENGINEERING LTD., 50, Farnham Road, Seven Kings, Essex.

Our "Coronet" Lathes. New Leaflet free for S.A.E.—GARNERS, Sheffield Road, Barnsley.

Target Gas Blowpipes from stock, 2s. 6d., plus postage 3d.—GARNERS, Sheffield Road, Barnsley.

Lathes Wanted, any type.—80, Ridgeview Road, London, N.20.

Offer from Stock, C.W.O. or C.O.D., Record Smoothing Planes, 2" wide cutters, 23s. 6d.; 2⅜" cutters, 28s. 6d.; Norris Precision hand-made Smoothing Planes, 2⅜" cutters, £3 15s. each; Crown 5" Self-centring Chucks, £4 10s. 6d.; Myford Capstan Lathe, vee drive, complete on stand; Lever-operated Collet Chucks to ½" diameter. Cut-off slide. Six-hole circular Capstan, lever operated, motorised, 440/3/50, or 230/1/50, price £42; Woodturning Lathe, 5" × 30", £15 10s.; Record Vices, 3" jaw, 17s. 6d.; 3½", 24s. 6d. All plus carriage.—CORBETTS (LATHES), Stanton Hill, Mansfield. Telephone 583, Sutton-in-Ashfield.

A Useful and Helpful Service. Stainless Steel strips, 18" × 5" × 20-g., 2s.; Aluminium sheets, 20" × 12" × 20-g., 3s.; 6½" × 20½" × ⅛" thick, 3s. 6d.; CH/CS steel screws, 4, 5, 6, 7, 8-B.A., ⅜"-1½", 2s.; ¾"-1", 2s. 6d. gross; Brass, plus 3d. gross; Hexagon full nuts, steel, 4, 5, 6-B.A., 3s. 3d.; 7, 3s. 9d.; 8, 4s. 3d.; 9, 5s. 6d.; 10, 6s.; 12, 6s. 6d. gross; Brass, 4, 5, 6-B.A., 2s. 6d.; 7, 8, 9, 10, 2s. 9d. gross. All plus postage. Hundreds of sections in stock. Steel and brass washers; Steel, copper, iron rivets; Boiler fittings; Steel angles, flats, rounds; Silver solders, flux. Cash with order, or C.O.D. Satisfaction or money refunded. Lists gladly sent. Will old and new friends kindly note new address.—A. J. REEVES, 171, Summer Lane Birmingham 19.

Wanted, Myford ML4 G.B.S.C. Lathe and accessories. Please call or write to—C. SEABROOK, 247, Ditton Fields, Cambridge.

Wade Lathe, 2" fitted geared chuck, foot motor and accessories, mounted rough bench, £12. Letters only.—17, Brackley Road, Beckenham, Kent.

Selling Up. Straight Shank Drills, H.S.S., Numbers 1 to 60 (only 8 used), 35s.; A to Z Drills (only 6 used), 34s., all guaranteed.—Box No. 4224, MODEL ENGINEER Offices.

Wanted, Bench Milling Machine, Senior, Bonds, or similar. State maker, accessories, dimensions, moderate price, inspected anywhere, 60 miles London, Midlands, or Lancashire.—5, Cadogan Road, Surbiton, Surrey.

For Sale, "Progress" No. 0 Bench Drill, motorised, 230 v. A.C. Had very little use, £21; Hand Shaper, 7¼" stroke, 10" traverse (hand and automatic), in first class condition, £10 10s.; Heavy dividing heads, 5" centre, swivelling headstock, spindle bored 1" and threaded 1¼" × 10 t.p.i., 40 to 1 worm, 3 division plates, £17 10s.; Wanted, Fixed and Travelling Steadies for 5" "Drummond" lathe.—R. THURLEY, 15, Bartlemy Road, Newbury, Berks.

Wanted, Small Lathe. Must be in good condition. Cash or exchange 9.5 Pathé "H" Projector, with case and screen.—R. COLE, Fraddon, Cornwall.

Air Compressor, direct coupled to 1/6 h.p. 230 v. A.C. motor, complete unit, with pressure gauge and tank, £12; Wanted, small power Planer, about 24" stroke, incomplete or defective machine considered.—STEPHENSON, 167, Woodcote Road, Reading.

Urgently Needed for Model Engineering Society Workshop, 4" to 5" B.G.S.C. Bench Lathe, motorised and with full equipment. Must be in fair condition. Please reply to—SECRETARY, Handley Page Sports Club, Claremont Road, Cricklewood, N.W.2.

MODELS & FITTINGS

Blue Prints of problems by return post. Latest super detail prints are Clipper "Stonehouse," 16s.; Racing Yacht, 14s.; Liner "Stirling Castle," 12s.; Destroyer "Cossack," Tug or Motor Yacht, 8s.; Centre Flue Boiler, 3s. 6d.; Blowlamp, 3s. Enquiries 2½d. stamp.—WILSON, MACDUFF & Co. LTD., 5, Victoria Street, London, S.W.1.

J.B.A. Eng. Co. have capacity available for making 2.5 c.c., 15 c.c. 2-stroke Model Aero Engines, standard models or your own drawings, prototypes, model parts, etc. Trade enquiries invited.—54, Broadway Court, Wimbledon. Wim. 2980.

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Finish Machine Parts, etc., for 1" scale Pacific Locomotive. Stamped addressed envelope for particulars.—W. BADGER, Cupola Works, Rotherham, Yorks.

Sale, Lowko hand-operated Water Pump, unused, 10s.; also miniature "Nife" Accumulator, suitable for model cars, etc., 10s.—TOWNER, 33, Downside Crescent, Hampstead, N.W.3.

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For Sale, 30 c.c. O.H.V. Petrol Engine, C.P.T. Ready-to-Run "Grayson Type," used only running in. Offers. Write—MR. L. LEGATE, 27, Bradford Road, Sydenham, London, S.E.26.

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As One Lot Only. Fixtures, tools for making "O" gauge steam engines, including 50 sets of parts (20 assembled and tested and running apart from superstructure). These engines are readily sold at £7 each. £150. No offers. —37, Links Road, West Wickham, Kent. Spring Park 4278.

27 yds. Bond "O" Gauge Rail, 180 sleepers, chairs, 6 assorted trucks, Hornby, clock. tank locomotive, Hornby 6 v. electric chassis, as new, Meccano circuit breaker, new, 6/9 v. transformer, station oddments. Offers. Villiers 98 c.c. engine, complete, £4; Chad Valley toy telephones, £2; G.E.C. home microphone, 10s. All plus carriage. S.A.E. reply.—49, Fairfield Road, Stockton-on-Tees.

For Sale, Complete Railway Outfits, steam, electric, clockwork; also stationary steam engines with boilers, Meccano outfit with clockwork motor. Full particulars and price.—55, Belmont Avenue, Hereford.

2½" G.W. 4-6-0 Chassis, link motion, excellent workmanship, £10; Cross-tube marine boiler, 6¾" by 2¾", blowlamp, container, pump, 30s. Details, S.A.E. Exchange small shaper or printing machine.—MILLS, 2, Fairlight Avenue, Chingford, E.4.

Exhibition Model "Queen Mary," in 5 ft. showcase, £7 10s. Can be seen at Astoria Cinema, London, S.W.9. Also 2½" gauge electric L.N.E.R. Pacific, built by Bassett-Lowke, super-detailed, cab fittings, brakes, etc., £50 or offer.—WHITE, 104, Furnham Road, Chard.

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½" Scale 73 ft. Vosper M.T.B.—Authentic detailed general arrangement print, 40" × 27", 6s. 6d. post free; with detailed construction print, instructions, 12s. 6d. set. Trade invited.—HUGHES, 87, Hopedale Road, Frecheville, Sheffield.

Two 3½" Gauge "Petrolea," no tender; also G.M. castings. Write for particulars.—W. FURLONG, 10, Hall Road, Wanstead, Essex.

Bourdon Steam Pressure Gauge, 7", 200 lb., as new, £2 10s. or offer; 1 F. and 1 C. Thermometer, 1 Hydrometer.—BLANCH, 170, Osborne Road, Brighton 6, Sussex.

Powerful Pacific Locomotive, pulls 30 children, 3½" gauge, £125; 2½" gauge Atlantic, pulls 3 children, £25; Model Petrol Engine for boat, aeroplane or car, £8 10s.; fine Steamboat, 39", £10; Pathé 200B, 9.5 Projector, £30; Dekko 9.5 Camera, £7 10s.—MILLS RADIO, Northfield.

"OO" Brass Rail, Points, etc., for sale. S.A.E. details. Wanted, MODEL ENGINEERS, 1935-36, "Midge Series," and MODEL ENGINEERS for "L.B.S.C." 5" Tank Locomotive.—J.W.G., 60, Fleetwood Road, Kingston, Surrey

Petrol Engine, 1½ c.c., complete coil condenser plug, only test run, £6. Seen running by appointment only. Also Water Motor, 5" diameter, 12s. 6d.; Adana Baby Printing Machine, no type, 7s. 6d.—RUTHERFORD, 172, Carlton Avenue West, North Wembley, Middx

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Transformers for soil heating and small welding jobs, 250/300 watts, 230 volts, A.C., enclosed in metal case, 75s.—Below.

Blowers, 12 volt D.C., for valve cooling or lab. work, £3 10s. ; 32 volt D.C. Motor Blowers, ¼ h.p. Motor with output of 500 cu. ft. per minute, £8 10s. —Below.

Bells, Outdoor, Ironclad Tangent for works or schools, 230 volts A.C., 6" gong, 42s. ; Indoor House Bells, 5s. 9d. ; Bell Transformers, 3-5-8 volts, 7s. 6d. ; Bell Wire, 15s. per 100 yds.—ELECTRADIX, 214, Queenstown Road, London, S.W.8.

New ex R.A.F. open type, 2 volt, 100 amp. Solenoid Switches, with bracket fixing, 3s. each.—Below.

Rotax 24 V. A.C.-D.C. reversible 0.07 h.p. Electric Motors, fitted with reduction gearbox, auto switch, solenoid brake and overhead clutch, with adjustable setting from 4.25 ft./lb., diameter 3½" × 12", weight 9 lb. Made regardless of cost, now at bargain price, £1 1s., including postage.—Below.

Brand New ex-Gov. Thermostats, steel glass tube type, mounted on S.B.C. double contact lamp base, settings between 40 and 50 C., suitable for fire alarms or warning signal for overheating, 4s. each.—Below.

Best Bargain Yet ! Large number of brand new Rotax Dynamotors, 24 v., delivering 95 v., with high amps. Will work on 12 and 6 v. Could possibly be made into welding plant, or as a motor for driving machinery, very powerful. Cost Gov. originally £30, now at a gift, £1 5s. each, including carriage.—EMMS, 26 \, Coleherne Mews, Earls Court, S.W.10. Flaxman 4596.

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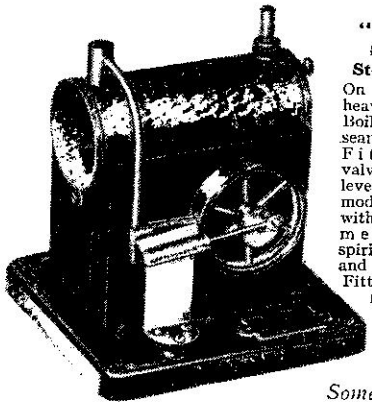

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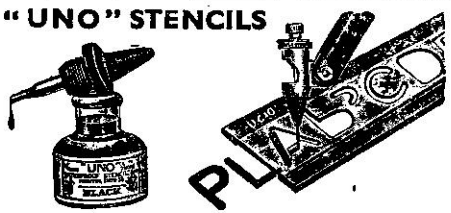

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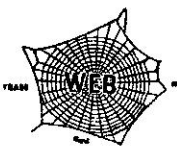

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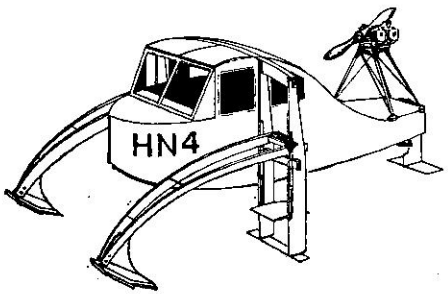

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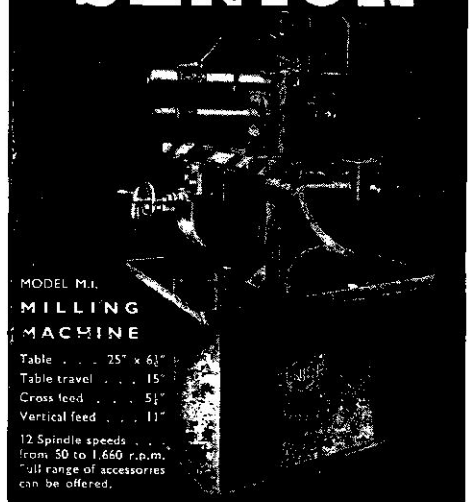
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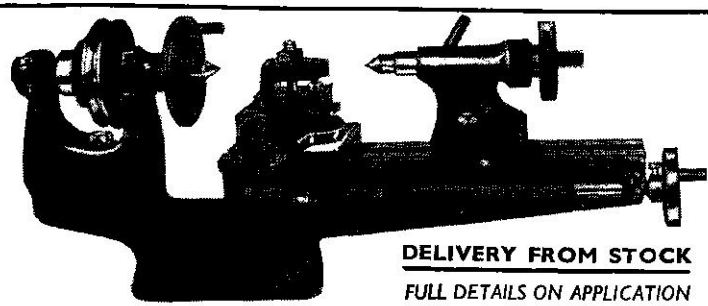

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